
MEDICAL REPOSITORY.

VOL. V.—No. II.

ARTICLE I.

An EXHIBITION of several wrong ASSOCIATIONS of IDEAS, whereby MEDICAL and CHEMICAL KNOWLEDGE have been remarkably perverted and retarded: From a Letter of Dr. MITCHILL to BENJAMIN RUSH, M. D. Professor of the Institutes of Medicine and of Clinical Practice in the University of Pennsylvania, &c. &c. dated New-York, June 10, 1801.

THERE is such difficulty in breaking established associations of ideas, that a great part of the toil of public instruction consists in pointing out those which are erroneous, and presenting in their stead such as are true. On moral subjects you know but too well how sometimes mankind continue in evil courses, through habit and imitation, without any deliberate intent to be sinners; and on physical questions you doubtless have remarked, that men are equally the dupes of mistaken opinions, because there are authority and fashion on their side, though they have no inclination to be wrong-heads. In both cases charity directs us to believe they are not influenced by any preference which they feel for error, but they oftentimes adopt it, and persist in it, through mistake, believing it to be truth.

Of the numerous examples that might be given of this, I shall, at present, only mention a few which have remarkably prevented improvement in the department of science wherein, of late, it has been my lot to be more particularly engaged. To show the cause of these misunderstandings will not be a very pleasant task; though, at the same time, if this is becomingly done, it can scarcely fail to be in some degree useful.

1. One of the prevailing errors is, *That the putrefactive process in animal substances, and in such vegetables as resemble them, being a copious source of deleterious and pestilential*

vapours, is characterized by affording a great quantity of volatile alkali.—If it can be explained how this mistake first arose, and was afterwards perpetuated, much will have been done towards its removal.

For the sake of making a fair statement of the opinions of philosophical men on the subject, I shall give a summary of the phenomena of corruption as stated by DE GORTER, one of the most respectable of them at the time he published, which was in 1730. In his account of putrefaction, which may serve as an example of the whole, he first affirms (*Medicinæ Compendium*, 180) that the exhalations of many bodies, while they decay and rot, *are truly poisonous*. Having ascertained this truth, he relates how he proceeded to find out what this poisonous effluvium was. In this undertaking he very honestly and unintentionally deceived himself; and, having done so, he became instrumental, as is common in such cases, in misleading others. Instead of devising some mode of detecting the qualities of the noxious vapour as it rose in common temperatures, and under common atmospherical exposure, he put a parcel of the putrefying mass into a retort, that he might know its analysis by distillation. Treated by strong force of fire, volatile alkali was obtained; and volatile alkali was, of course, considered as the cause of all the mischievous effects wrought by the gases exhaling from corrupting bodies. (*Ibid.* Tract. xxxvii. § 4). This inference he judged to be fair and conclusive; and the interpretation which satisfied DE GORTER has been deemed adequate and sufficient by almost every person since.

Their mode of reasoning, in plain terms, was this: Corrupting substances, exposed to a distilling heat in close vessels, afford ammoniac: putrefaction is a process analogous to distillation; therefore putrefaction produces ammoniac.

Now, any person the least conversant in syllogistic expressions will instantly perceive the faultiness and incoherence of the one just made; for the first and second terms clash with each other. Experience has abundantly proved, that the result of chemical processes is singularly modified by the prevailing temperature, or, in other words, *by the degree of caloric present*; and it has been as clearly shown, that in all instances of new combinations formed among the dissociated atoms of organized bodies, there is a certain natural order and succession, according to which the new products are formed; acids being produced first of all, and the other liquids and gases in their turn afterwards. Thus, when a body putrefies on a surface of earth heated to a

degree varying between the 85th and 120th of Fahrenheit's scale, acid and noxious fluids are frequently engendered; but when corrupting substances are acted upon by a degree of caloric as high as the 212th, which is the boiling or distilling point, combinations are formed from the very same materials, of very different constitutions and qualities. All reasonings, therefore, from the former of these instances, are wholly inapplicable to the latter, and conclusions from the latter are as little referable to the former.

DE GORTER, indeed, seems to have been aware of the inconclusiveness of his experiments, and of his inferences from them; for directly afterwards he observes that the ammoniac did not exist, *before distillation*, in the smallest quantity, but was altogether produced *during the operation*. And really so little was his mind attached to any hypothesis on the subject, that after passing from the volatile to the *fixed alkalis*, he, in the next chapter (*Ibid.* Tract. xxxviii. § 15), praises them for their efficacy in cleansing sordid ulcers, for removing pimples, and for curing spots and blotches on the skin occasioned by an acid, and recommends them as excellent substitutes for the bile when that fluid is deficient: and then reverting to *volatile alkali*, he is so far from considering it as a poison, that he ascribes to it, among other qualities, those of an excitant and a cooler in many conditions of the constitution.

These observations which are offered to you concerning this writer, apply to all his followers and imitators to the present time, who have, unhappily for themselves and for science, associated the ideas of putrefaction and alkalescency, and cannot think of the one without bringing to mind the other, though there is no manner of necessary connection between the two.

2. A second error, connected with the first, and, indeed, in some measure growing out of it, is, *That the gall of animals, known to be of an alkaline quality, is a most dangerous excretion*, often becoming acrid and venomous, and stirring up that formidable class of diseases thence denominated "bilious."—If the charges against alkalies under the preceding head are unfounded and unjust, the accusations against the bile as a mischievous fluid, because an alkali, will be found totally destitute of support. It was natural enough, before men acquired a habit of nice discrimination, for them to attribute many morbid effects to the agency of the bile. Often, and in some of the most serious diseases, they beheld that liquid secreted in large quantities,

and sometimes with altered qualities; and as it struck their senses more than any thing else, they concluded it was the cause of the greater part of the alarming symptoms which they witnessed. Accordingly, fevers of various forms, where bile was copiously poured out, not to injure the constitution, but to protect it against the virus by which it was assailed, were falsely and injuriously denominated "bilious;" thereby suggesting to the mind that the "bile" was the exciting cause of the miseries endured. And this notion, groundless and untenable as it is, so frequently occurs to the eye in books, and to the ear in conversation, that almost every body assents to it as an established truth. So strong is this association of ideas between bile and fevers, that a long time must elapse before a prejudice so deeply rooted, and so widely spread, can be destroyed. Attend, if you please, to the violence of prejudice on this subject, as contained in the volumes of physic which lie before me.

So strong was the persuasion among the generality of persons, of the noxious quality of the bile, that BONETUS, the celebrated anatomist of Geneva, (Sepulchret. lib. iv. § 10.) made experiments to show they were in the wrong. A fashionable opinion in his time was, that the venom of the viper resided in its gall, and that this fluid, infused into a bleeding wound, excited a poisonous, or, in other words, a bilious disease in the body of the animal bitten. But BONETUS became convinced, by the experiments which he witnessed, that the bile of that serpent was not only destitute of poison, but was endowed with a balsamic and purifying quality; *at contra pollere vi balsamicâ mundificante pluribus idoneâ*. This error being refuted, BONETUS went further, and proved that the *volatile alkali*, so far from being itself a poison, was an *antidote to poison*: for he relates the case of a young nobleman cured of the most alarming symptoms consequent upon the bite of a viper, by the free use of the *volatile salt of vipers*. The particular account of this antiquated remedy, and of its preparation and virtues, may be seen in *Triller's Dispensatorium Pharmaceuticum*, p. 613, where a number of authors is referred to. This antidote, the *sal viperarum volatile*, turns out to be neither more nor less than the *sal cornu cervi*, or salt of hartshorn of the shops; only that, instead of being prepared from the antlers of the deer, it was obtained from the cleansed and dried flesh of vipers. The dose was a quarter of a dram every half hour in treacle-water. This celebrated remedy of *volatile salt of vipers* is thus proved to be mere

ammoniac, or volatile alkali; and, what is remarkable, BONNETUS speaks of it as known to every body in his time (*remedio satis omnibus noto*) for its antivenomous efficacy on brute animals as well as man.

On the innocent quality of *human* bile there occurs to me a good remark made by MALPIGHI. (*Opera Posthuma*. p. 22.) During the rage of a severe epidemical distemper in Pisa, in 1661, the philosopher BORELLI wrote to MALPIGHI for his opinion concerning it. MALPIGHI, in his reply, observes, among other things, that the bile cannot be the cause of the disease, because, in cases where large quantities of that fluid are mingled with the blood, as in jaundice and other similar diseases, no fever is occasioned thereby—"Di piu osservo che dove copia di bile confusa col sangue, *non segue febre*, come s'osserva nel *itteritia* et altri simili." This single objection is fatal to the hypothesis, and conclusive against the origin of fevers from absorbed bile. And still, notwithstanding its total opposition to truth, our wise men, as well as our weak men, talk of *bilious* fevers, and *bilious* colics, and *bilious* dysenteries, and *bilious* diarrhoeas, arising from redundant and acrimonious gall, as familiarly and decidedly as they speak of drunkenness from distilled spirits, or of sleepiness from the juice of the poppy. But these are gross deceptions. The streams of bile which, in these instances, so startle and terrify them, are poured from their canals and reservoirs, not to disorganize or ruin the constitution, but instantly to mingle with the peccant humours and hostile acids which disturb the internal quiet and order of the system, and to bear them away to a distance, where they can injure no more.

The error into which we fall, in respect to the bile, is, that we mistake the effect for the cause. Something stimulates the duodenum or the hepatic ducts; and down comes a gush of gall to neutralize that something, and carry it off. The morbid stimulus, like a concealed enemy, eludes discovery by sight, but the friendly gall obtrudes itself upon the view. By a perversion common enough in life, the friend is mistaken for the foe, and loaded with curses and execrations accordingly.

3. There is a third error associated with the two already explained: *As alkalescency and putrefaction were associated, the bile being an alkaline fluid, was, of course, considered as highly putrescent.* Hence alkaline remedies have commonly been avoided in the diseases called "*bilious*," for fear of increasing their putrid tendency; or, if they were administered,

they have been so disguised by combination with acids or other things, that their prescribers did not direct them as alkalies, nor, in many cases, even know, by their names or qualities, if they were official preparations, that the remedies they ordered contained an alkali.* In many such diseases acids have been the fashionable remedies, under the belief of their being grand antiseptics, and capable of correcting the corrupt degeneracy of the bile.

Alkalies, in their unconnected or caustic condition, are well known to be too active for employment internally as medicines, except in very small quantities. For this reason they are generally taken in combination with acids, and in these forms can be swallowed with safety to a considerable amount. These compounds, which are called "neutral salts," may operate in two ways; 1. They may increase the peristaltic motion, and operate as evacnants, without undergoing any decomposition in their passage; or, 2. They may suffer decomposition in the alimentary canal, if they meet with any thing there possessing a stronger attraction for either of the constituent parts of the neutral salts than the ingredients have mutually for each other.

But experiments innumerable have shown the predominating acidity of the stomach and intestines in many cases; and they have proved, also, that the acid abounding there can decompose many neutral salts by virtue of a more powerful attraction for their alkaline bases than these have for their own respective acids. Neutral salts, therefore, while passing through the alimentary tube, preserve their neutrality if they meet with no hostile acid; but if they do, they *break their neutrality*, and, in that case, act as alkalies. In many disorders where thirst is distressing, and acids earnestly called for and well relished by the sick, there is often an advantage in directing them, *not alone*, but *under-saturated* with alkali. Passing thus under cover of a weak and friendly acid, it is ready to subdue any more powerful and mischievous acidity which it may meet with. It is on this principle that muriate of soda, dissolved in acetous acid (that is, the celebrated mixture of vinegar and salt), is so good a remedy for dysentery. The discovery of its efficacy has been supposed to be very recent: this, however, is not the fact; for I remember the very prescription is mentioned by DIEMERBROECK, in his treatise on the plague which prevailed at Nimeguen in 1635, 1636, and 1637, (lib. iii. chap. 5, § XXI.) as an excellent *anti-pestilential* remedy. He relates that such as took full draughts of

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Gentlemen of the Faculty: ought not to make too much of an Outcry against those, whom they may be pleased to term Quacks.

it were thrown into a most copious perspiration, and obtained speedy relief. DIEMERBROECK even quotes authorities, if I mistake not, (ibid. § X.) for the cure of many patients, by drinking the clarified brine of pork and of anchovies. And in latter years, Dr. Wright's successful practice in dysentery, by means of sea-salt and lemon-juice, is generally known. And now, as I have referred to the old Dutch physician, I shall just remind you of his testimony in favour of *alkalies* in pestilential diseases. A number of the receipts he has left contain a portion of pot-ash. And he quotes several authors of note, who attest the benefit derived from alkaline salts. Pot-ash, obtained from *carduus benedictus*, *scordium*, worm-wood, rue, scabious, mugwort and ash, he affirms, had all their warm advocates, because they were found both to *resist the malignity of the distemper and promote sweat*.

4. There is a fourth error respecting the word "nitre" and its meaning, which ought instantly to be corrected: *The "nitre" of the ancients was totally different from that of the moderns.* Ours is not the true "nitre," but only salt-petre, a salt which has been extensively but falsely called "nitre." It ought to have been distinguished in common language by some other proper and appropriate name, and not have been confounded with a substance which it resembles so little.

It is a curious question how the ancient term "nitre" came to be transferred to a substance so widely different from it as salt-petre is. It seems to have happened in somewhat the following manner:—Europe furnishes but small quantities of native mineral alkali, or "nitre." When, on certain occasions, it became difficult for the people of that enlightened part of the globe to get supplies of "nitre" from Egypt, it was a desirable object to find a substitute for so useful a remedy. On making trial of various things, it was discovered that the alkali obtained from the beech, the oak, and other trees (pot-ash), might be employed instead of the true and oriental nitre (soda). On carrying experiments further, it was found afterwards, that if the corrosive spirit was entirely separated and driven off from salt-petre, the alkali which remained (pot-ash) would not any longer burn, but would shoot into crystals, and operate charmingly in ardent fevers. Thus pot-ash from burned wood and decomposed salt-petre was substituted for native "nitre" (soda) in many cases. By degrees the substitute acquired the name of the original article. "Nitre" became the term to express the basis of *salt-petre*, and, by degrees, the same word which had signified the alkali

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remaining *after* the separation of the acid, was applied to signify the undecomposed salt-petre, or pot-ash in connection with septic acid. Such, however, is the influence of names, that at length physicians gave themselves no trouble to separate the acid from salt-petre; but, under the delusion of its modern title, they gave, and still perniciously continue to give their patients the *septic of pot-ash*, where, according to the true intent and meaning of the case, they *ought to give them carbonate of soda*.

In this manner was the term "nitre," which originally meant what is now called *carbonate of soda*, perverted from its ancient meaning, and employed to denote *septic of pot-ash*. But it may be asked how this modern "nitre" acquired the name of salt-petre, or rock-salt, or sal-petræ? The probability is, that it was so called because it was found ready formed in earths and on calcareous stones and rocks (petræ). Though there is another story, that when Egyptian "nitre" grew scarce in Greece and the more western parts of Europe, there was a substance used in lieu of it, which was gathered in Macedonia, and known by the name of *alumen galasterium*. Among the ancients the term "alumen" was very vague; for "alumen catenum" is one of the names of the *cineres clavellati*, or pot-ash, as "alumen plumosum" is a species of asbestos, &c. Galasterium is derived from γαλα, milk, and σκληρον, solid, because it looked like firm or coagulated milk: So "galactites," as Dioscorides relates, was a milk-coloured concretion growing out of a lime-stone, &c. This "alumen galasterium," then, was a white and compact alkali, and though not soda, yet, from its resemblance to that alkali, and its substitution for it, was distinguished, at length, improperly enough, by the old appellation "sal nitri," and afterwards by the more modern denomination "sal petræ." And the latter name was continued even after the acid of putrefaction, floating in the atmosphere, had been attracted by the alkali, and associated with it into a neutral salt.

If the word "nitre" had been diverted from its primitive signification no further than to mean the fixed vegetable alkali, or pot-ash, either in its simple form, or in conjunction with carbonic acid, there would have been some confusion introduced into science thereby, but the practical inconveniences would not have been very serious. They would have amounted to little more than the *employment of carbonate of pot-ash* instead of *carbonate of soda*; and, generally, this would have been an innocent exchange. But when it is perverted, and

extended so far as to mean the neutral salt composed of the acid of putrefaction and pot-ash, the consequences of such an abuse of language are of a solemn and alarming nature. I shall mention *two* of them: 1. The ascription to the venomous and nauseous drug, salt-petre, all the excellent and salutary medicinal qualities for which the "nitre" of the ancients was justly celebrated: and, secondly, the exhibition of this modern "nitre," or salt-petre, ignorantly and injuriously, by physicians to their suffering patients; whereas, if they had fully comprehended the subject, they would, instead thereof, use the benign and salutary "nitre" of the ancients, or carbonate of soda. If my physician, miscalling jalap by the name of *Peruvian bark*, should actually give me parcels of the former, when he verbally prescribed the latter, I should think him a very unsafe practiser, at least where those two remedies were concerned. And equally unsafe is he who, giving to so deleterious a thing as salt-petre the name of so safe and admirable a medicine as "nitre," in its ancient sense, harasses the sick by portions of the former, instead of comforting them by doses of the latter. This is an important point of practice, and deserves immediate attention from all prescribing physicians and all intelligent patients.

This "nitre," collected from the neighbourhood of Naucratis and Memphis, possessed, among others, the following properties: If meats were salted with it, they turned white, and looked the worse for it; but if it was sprinkled on pot-herbs and sallads, they turned to a more beautiful green: if a man, having an ulcer on any part of his body, frequented the pits where it was collected, the sore soon healed up and skinned over: prescribed in tincture, decoction and cataplasm, with various vegetable substances, it was good for pimples, tetters and eruptions, and especially for breakings out and exulcerations on the face, for spots in the eyes, for soreness and raggedness about the finger nails, and for the tooth-ache, if applied to the mouth and gums: it was reckoned an excellent dentifrice, and restored blackened teeth to their natural whiteness: when made up into ointments, plasters and liniments, it was good for corroding ulcers, and for the bites and stings of venomous creatures: it was excellent for burns, and might be administered in clysters advantageously for a flux of the belly: it corrected the rank smell from the arm-pits, if they were washed with a solution of it in water: with oil it formed a good mixture to anoint the whole body with before the cold fits of agues; and the same ointment was good against leprosy and unseemly spots and freckles which blemished the skin. Such were the

qualities of "nitre;" yet, unhappily for medicine and the kindred arts, when salt-petre was invested with its *name*, it was presumed to possess its *virtues* also, while "real nitre," stripped both of its title and its property, was obliged to yield to the claims of the usurper, and to go into a long and ignominious exile. But the day of restitution is at hand, when *salt-petre* must lay aside its fictitious and assumed character, and "nitre" be restored to its former honours and possessions.

Of salt-petre it may be worth the while to observe, that it was known to the gentlemen of the Academia del Cimento at Florence, before the year 1667, that a fish, put into a watery solution of it, would die in two minutes, and its gills would be ruddy. (*Tentamina Natural.* &c. p. 123.)

5. Before I conclude a fifth error remains to be considered: this is, *That lime or calcareous earth is a septic substance, and promotes putrefaction at a rapid rate.* So general is this belief, that the idea of lime has of late been almost invariably associated with that of putrefaction. Even in agriculture calcareous earth has been recommended for the purpose of promoting the corruption of animal and vegetable substances on the land.

This opinion seems to have been adopted about the middle of the eighteenth century, and chiefly on the credit of PRINGLE's experiments. But facts of a different import are found among the older writers. For instance, FABRICIUS AB AQUA PENDENTE, who flourished toward the end of the sixteenth century, has informed his reader (*Opera Chirurgic.* lib. i. cap. 24) of the usefulness of the *calcareous powder* of the shells of *snails* and *river-crabs* (*elimacibus et cancris fluviatilibus*) in cancers. For ulcers difficult to heal, and overflowing with vitiated humours, burned *oyster-shells* and quicklime are ingredients in some of his receipts for dressings. *Calcined hartshorn* and *washed lime* enter into some other of his formulas.

ETMULLER declares (*Oper. Medic.* tom. i. p. 807), that the lime-water formed by pouring common water upon calcined marble, strange as it may seem, was extolled for its virtue in gangrene, and a plaster of the lime itself used as a secret remedy for gangrenous ulcers. But it is not necessary to multiply authorities.

I shall, however, bring to your recollection the amusing account given by Mr. BRYDONE (*Travels into Sicily, &c.* vol. i. p. 326) of the calcareous earth collected in Malta. On that island is a grotto, rendered famous and venerable for having been visited by the Apostle PAUL. From the surface

of the rocks, in many spots, they scrape off a powder which is formed by a crumbling or decomposition of the *free-stone* of which this excavation, and, indeed, the whole island, consists. This the people collect with great care, put it up in boxes, and export it to various parts of the world as a *medicine*. It is celebrated for its efficacy in *small-pox and fevers*. Though this remedy was probably introduced by superstition, there can be no rational doubt entertained of its being a very proper prescription in various states of those diseases.

To the calcareous earth around the city of Bath, in England, and in its waters, is ascribed the immunity of the inhabitants from the ague. The author of this opinion is Dr. LYSONS; and LYSONS was a Bath physician, and wrote observations on the qualities and effects of the mineral waters there.

There are two words much employed in discussing subjects of this sort, to which there is very little of precise meaning annexed. The words I allude to are *acrid* and *acrimony*. What is to be understood by them? An old French writer has left something which tends towards an answer of this question.

RAYMUND VIEUSSENS, of Montpellier (Tractatus De Remot. et Prox. &c. cap. 20 and 21), divides salts into "acrid" and "acid." The former of these, the *acrid salts*, have, by the moderns, been denominated *alkalies*. Hence we have the original meaning of *acrid* as synonymous with *alkaline*, and of *acrimony* as meaning the same with *alkalinity*. But the term has been since abused, and extended to arsenic, alun, and almost every thing of a corrosive nature. VIEUSSENS, I will just observe, was a most strenuous supporter of the *acid nature* of the exciting cause of fevers. (Ibid. p. 272, 273.)

These attempts to relieve the mind from the tyranny of ancient error are among the most irksome of literary labours. But this is not the worst; for he who does them must expect such raillery as the following from the rambling versifiers of the age:

Forth steps the spruce philosopher, and tells
Of homogeneal and discordant springs
And principles; of causes how they work
By necessary laws, their sure effects
Of action and reaction. He has found
The source of the disease that nature feels,
And bids the world take heart, and banish fear.

COWPER.

But the zealous lover of truth must disregard such idle raillery.
Yours, &c. &c.

ARTICLE II.

An Account of the SALUTARY EFFECTS of BLOOD-LETTING in curing the DISEASE brought on by taking excessive Quantities of OPIUM: In a Letter to Dr. MITCHILL, from BENJAMIN RUSH, M. D. &c. &c. dated Philadelphia, July 8, 1801.

DEAR SIR,

ACCEPT of my thanks for your ingenious letter upon the influence of association in perpetuating errors in Chemistry and Medicine. The same operation of the mind has much to answer for in keeping up most of the errors of every other branch of science. To dissolve false associations, and to combine facts according to their natural and just relations, appear to constitute perfection in the intellectual faculties of man.

In return for your polite favour, I shall now communicate to you an account of the salutary effects of a new remedy in the cure of the disease brought on by taking excessive quantities of opium.

The disease is a plain one. It is the result of a powerful stimulus acting upon every irritable part of the body, and generally prostrating their actions, or, in other words, suffocating the excitement of the whole system. Exactly the same phenomena are often produced in the body by the miasmata which induce yellow fever. Reasoning from this analogy, I have prescribed the same remedy in the former as in the latter disease, and with success in four cases. The remedy is BLOOD-LETTING. In two of the cases it was very copious. In one of them the blood exhibited an inflammatory crust. An emetic was given in three of the cases as an auxiliary remedy, and would have been administered in the fourth, had not the recovery from bleeding been so rapid as to render it unnecessary. You will not expect me to mention the names of the persons who have been thus happily saved from the grave, when I add, that the opium was taken by each of them to produce voluntary death. The young gentlemen who administered the remedies to three of the above patients, under my direction, were Dr. William Alston, now of South-Carolina, Mr. Thomas Rowan, and Mr. John Wooten. The fourth patient was attended exclusively by Dr. Caldwell and myself. He had taken the opium in a paroxysm of temporary derangement.

Do not suppose I wish to recommend the indiscriminate or exclusive use of the lancet in the disease which has been mentioned. Bleeding should never be prescribed until great morbid action, or the suffocation of action from excess of stimulus (manifested chiefly in the depressed state of the pulse) have taken place. Previously to the appearance of these symptoms, an emetic alone often gives relief; and after bleeding, sinapisms of mustard seed, the warm-bath, spirit and water, and perhaps Dr. Seaman's remedy of stripes, appear to be indicated.

If you think the above facts worthy a place in your excellent Medical Repository, they are at your service.

With the most cordial wishes for the success of your labours for the benefit of mankind, I am, dear Sir,

Your sincere friend,

BENJAMIN RUSH.

ARTICLE III.

Some THOUGHTS concerning DREAMS. By JOSEPH PRIESTLEY, LL. D. &c. addressed to the Editors of the Medical Repository.

GENTLEMEN,

THAT ideas have a permanent existence in the mind cannot be denied, because sometimes voluntarily, and sometimes involuntarily, they occur long after their first introduction. The brain, therefore, by means of which the mind is furnished with all its ideas, and which is the repository of them, must be of such a texture as not only to receive, but firmly to retain, the impressions that are made upon it by the external senses. It must also be capable of keeping them in a dormant or quiescent state: for ideas may be forgotten, and, at a great distance of time, recollected, and yet with the greatest certainty of their being the same that they were at the first. By what kind of mechanism this is effected is one of the great secrets of nature; but the opinion of Mr. Hartley, or rather of Sir Isaac Newton, seems the most probable, viz. that, during the presence of any sensation, some part of the substance of the brain is in a vibratory motion, and that in retaining a disposition to vibrate in the same manner consists the dormant state of the ideas communicated by sensation.

On any hypothesis, the disappearance of any particular

train of ideas, by their falling into a dormant state, must consist in the inaptitude of the region of the brain to which they belong to be excited; and, in the case of sleep, this may be owing either to the *compression* of a part or the whole of the brain, so that it shall be kept by force from performing its usual functions; or to *relaxation*, similar to that of the fibres of the muscles in the same state. And as one of these is evidently the cause of the other, the muscles being necessarily relaxed during sleep, it is the more probable that they are both affected in the same manner, at the same time.

In whatever it be that this dormant state of ideas consists, I cannot help inferring, from certain phenomena in dreaming, and also in delirium and intoxication, that in the brain, which is a substance of considerable size, there are different regions, in some of which ideas may be repositied out of the reach of ordinary excitement, but in which they may be revived in particular circumstances, so that few or no impressions ever made upon the mind are wholly lost; as was observed by Dr. Rush, in a very interesting note to his *Life of Mr. Drinker*, Essays, p. 296.

That there actually are regions of the brain, the repository of ideas and of knowledge, which are sometimes out of the reach of voluntary excitement, is evident from some persons entirely forgetting certain languages when they are in health and sober, and speaking them fluently in a state of delirium, insanity, or intoxication, of which some remarkable instances are given by Dr. Rush, in the note above-mentioned. One is of a French Countess who had forgotten the Welch language, which she had learned of her nurse, and yet spake it, and no other, in the delirium of a fever; and another of a young man who, he told me, was a fellow student with him at Edinburgh, who spoke French fluently as he was conducting him to his lodgings, after drinking too much; though the next day he not only remembered nothing of it, but was unable to speak that language at all: but he had been well acquainted with it when he was a boy. That this knowledge of these languages, and, consequently, the ideas that were the elements of it, actually existed in the mind and the brain, though in a dormant state, cannot, therefore, be denied: for in a state of extraordinary excitement, or excitement of a peculiar kind, the knowledge of them was actually revived. I have heard other facts of the same kind very well authenticated.

In a state of perfectly sound sleep, all ideas, as far as appears, remain in this dormant state. But this, I believe, is the case with very few persons: for most persons never sleep without dreaming more or less: that is, though many of their ideas are in a dormant state, others are not so, but occupy the mind, and sometimes even agitate it to a great degree, almost as much as in the most intense exercise of its powers when awake.

With some persons these sleeping thoughts are a continuation of those with which the mind was occupied when it was awake; but with myself, and many other persons, this is very rarely the case, the sleeping thoughts having no connection whatever with the waking ones. On the approach of sleep they may be observed to come from some very different quarter, and gradually to exclude the others. Consequently, while one part of the brain is either compressed or relaxed by sleep, and the ideas belonging to it become dormant, other parts are more excited; so that the ideas repositied in them come forth, and occupy the mind till the approach of vigilance. This circumstance was first observed to me by an ingenious friend in England, and since I have heard it I have given particular attention to it, as much, at least, as the nature of the case will admit: for a person must awake in particular critical moments to be able to make any observations of the kind.

I remember, however, that before I heard this remark of my friend's, I once awoke from a dream attended with circumstances exceedingly favourable to his idea, and the hypothesis above-mentioned. I thought I was attending a public speaker, whose vociferation was very loud, and his tones very peculiar. Before the harangue was concluded I awoke. But still, though no articulation could be perceived, I had a distinct hearing of the peculiar tones of the speaker, resembling notes in music; and, lying perfectly still, I attended to the sound a sensible space of time. To satisfy myself that I was really awake, I opened my eyes, and saw distinctly every thing in the room in which I lay. How long I might have retained this sound, remaining from my dream, I cannot tell; but on a very slight motion of my head it instantly disappeared. Some time after this I awoke from another dream in similar circumstances. I thought I was examining an unfinished building, and, standing on some rafters near the roof, I heard two of the carpenters speaking very loud to each other; and, awaking, I very distinctly heard the sound of their voices, a

short time afterwards, though I could not distinguish any of their words.

In these cases it seems evident that the region of the brain in which the dreaming thoughts prevail must have been different from that which is occupied by the waking ones, and that one of the trains of ideas excluded the other.

If I might indulge a conjecture on so obscure a subject, it would be, that the region of the ideas which occur in dreams is more deeply seated, and, therefore, that this interior part of the brain is not so soon affected by the cause of sleep as the exterior part. If sleep be occasioned by the compression of the brain, as experiments made on the Parisian beggar (who could be made to sleep at pleasure, by pressing that part of his brain which was not covered by the skull) seems to make probable, some light may be thrown upon it from the consideration of the state of the brain during sleep, when it is said all the arteries of the body are more empty, and the veins more full, than in a state of vigilance.

In the brain the veins do not accompany the arteries, as in other parts of the body, but enter the skull, and issue from it in different places; and the ramifications of the veins spread over the lateral sinuses of the dura mater, which incloses the brain. During sleep, therefore, the external parts of the brain will be compressed by the distention of these veins, while the arteries in the interior part being less distended than in a state of vigilance, those parts of the brain that are contiguous to them will be relieved from their usual pressure.

If the disappearance of ideas in sleep be owing to a relaxation of any part of the brain, it is possible that, on this very account, other parts, at some distance, may be in a state of greater tension, the principle of excitability, whatever it be, being, as it were, concentrated in them. But I am by no means satisfied with these conjectures, and only mention the facts in order to draw the attention of anatomists and physiologists to a subject highly interesting, and not yet unexplored.

It is something favourable to the hypothesis of the ideas excited in dreams having their seat in some region of the brain more deeply seated than that which is occupied by our waking thoughts, that many persons (and I am one of the number) seldom dream of any thing that is recent. The persons that occur in their dreams are generally those that have been long dead; but yet they are never considered as having been dead, but as alive, and they speak and act in their proper characters.

It seems to follow, from this, that only that part of the brain is at rest which was occupied by the more recent trains of ideas, while those which penetrated deeper are not so much affected by the cause of sleep. But at one time those ideas must have occupied the regions affected by sleep, and I am unable to form any tolerable conjecture how they have come into a different situation. I therefore leave the subject to the greater ingenuity of your numerous readers, and am, gentlemen, yours, &c.

J. PRIESTLEY.

ARTICLE IV.

Some OBSERVATIONS on the BLACK-VOMIT: Communicated by Dr. P. S. PHYSICK, of Philadelphia, to Dr. MILLER.

HAVING, in the years 1798 and 1799, had frequent opportunities of dissecting the bodies of persons who died of the yellow fever in the City Hospital, I had thoughts of publishing a circumstantial detail of the several appearances in each case: On perusing, however, the descriptions given by late authors, I find but little to add to them, except some observations respecting the black-vomit, which do not appear to have been particularly noticed.

The common opinion was, and, for any thing I know to the contrary, is, at the present time, that this black matter is poured out by the liver: the dark coloured appearance of the bile, in its accumulated state, approaching more to the colour of the black-vomit than any other secreted fluid, would very readily induce a person to conclude they were the same, if he did not compare and examine them carefully, and likewise attend to several other circumstances.

By such an examination the following differences have been observed.

First. If the darkest coloured bile be spread thinly over a white surface, such as the skin, it loses the black colour it had in its accumulated state, and appears of a yellowish green colour: but if the black-vomit be treated in the same way, it retains its black or dark brown appearance.

Secondly. The bile in the gall-bladder has its common bitter taste, but the black-vomit is generally insipid, or nearly so. This fact has been ascertained by several persons, and,

among others, by the late Dr. S. Cooper. I have inquired of a number of patients just after they had vomited it: they almost all of them declared it to have no taste, and the organs of taste were proved to be perfect in these people, by trying whether they could distinguish between different tastes. It occasionally happens, that violent efforts made in vomiting will force some bile out of the gall-bladder into the stomach, and then the black-vomit will have a bitter taste, like bile. Dr. Cooper twice found it intensely bitter, owing to this circumstance; which, however, is a rare occurrence.

Thirdly. The black-vomit differs very much from any mixture that can be made of the dark coloured bile with any of the fluids found in the stomach or intestines. If bile be mixed with the mucus of the stomach, or if some of it be added to the black-vomit, it mixes with these uniformly, and imparts a yellowish green tinge to them. The nearest resemblance to black-vomit that could be made, was by mixing some of the mucus of the stomach, a little blood, and some of the bile together; but the difference was still very obvious.

Fourthly. The stomach has been found full of black-vomit, when, in the same subject, the fluid in the gall-bladder and biliary ducts was very different from it in its colour and appearance. I have found the gall-bladder filled with a fluid of a brick-dust colour: in some others it contained a fluid of a light green colour; and in others a transparent and colourless fluid, resembling the white of an egg, only that it was of a thinner consistence. In some instances, again, a purulent coloured fluid was found in them. Some of the same kind of fluid which the gall-bladder contained, in these last-mentioned instances, was generally found in the duodenum—the stomach, in the same body, containing black-vomit.

Fifthly. The pylorus, in several instances, has been found closely contracted, and yet the stomach contained black-matter.

The above observations have appeared to me to overthrow the idea of the black-vomit being secreted by the liver. The question, however, still remains, from whence is it derived? I believe it to be a secretion from the inflamed vessels of the stomach and intestines—and for the following reasons:

1st. It is found in these viscera when it cannot be detected in any other organ or cavity connected with them.

2dly. It is often found of so thick a consistence that it does not mix with the fluids of the stomach: in such cases it ad-

heres to its inside, forming a black coat of considerable thickness; and, when it is once scratched off, it cannot be made to adhere again in the same manner.

I have, in one instance, observed this black substance, in two almost circular patches, each about two inches in diameter, adhering to the stomach—all the other parts being free from it. In this case there was no black matter loose in the cavity of the stomach nor intestines. On scraping it off, the spots which had been covered by it were found inflamed, and these spots only. Now, it can hardly be possible for this black substance to have got into such a particular situation had it been secreted by the liver; and some of it, in that case, would have been observed in the gall-bladder, gall-ducts, or duodenum. It must not be conjectured that the black-vomit irritated the stomach, and produced the inflammation. On the contrary, Dr. May frequently repeated an experiment which proved it to be very bland. He dropped it into his eyes, and never experienced any more inconvenience from it than if water had been used. When the hands have been irritated in dissecting, which once occurred to myself, I believe it has arisen from some acrid substance having been swallowed by the patient just before death—as elix. vitriol, alkal. volat. &c.

Fourthly. I have seen the inside of the inflamed stomach as black as the black-vomit, resembling it in colour exactly. In most of these cases no black matter was found in the cavity of the stomach. The vessels only which were inflamed were distended with it. This colour differs very much from the dark purple of a part in a state of gangrene. And I never observed any putridity attending it. This blackness has, in some stomachs, been universal—in some in spots only: other spots being in a state of high inflammation, giving the inside of the stomach a checquered appearance. These spots, in one instance, were seen resembling each other in shape and figure exactly, and were in every respect alike, except in colour—the one being red, the other black. Here some of the inflamed vessels only had gone into the act of forming black matter, but did not excrete it.

The secretion of black-vomit appears to be one of the most common modes in which violent inflammation of the stomach has a disposition to terminate. Death, however, in general, takes place before it entirely disappears. I have seen many cases which show that the inflammation is diminished by the secretion—of which it will be sufficient to mention the fol-

lowing: On opening a stomach, one half of it was coated with adhering black matter, while the other half was free from it; on scraping it off clean, and comparing the part underneath with the other half of the stomach which had not secreted any black matter, the difference in the degree of inflammation was very striking, being much the least in the part which had been covered with the black substance.

In some cases, where the vomiting of black matter had been considerable in quantity, or continued for several days, the inflammation was found very faint indeed; and, in some, the inside of the stomach appeared as if covered over with a vast number of small glands, like mucous follicles crowded together.

Philadelphia, October, 1800.

ARTICLE V.

The good Effects of SNEEZING in HYDROCEPHALUS: Communicated in a Letter from Dr. MALACHI FOOT, of New-York, to Dr. MITCHILL, dated June 27, 1801.

DR. DARWIN, after having established, generally, the doctrine of retrograde motion, as one of the functions of living bodies, in his observations on hydrocephalus internus, (vide class i. 2. 3. 12.) has the following sentence:—"As by stimulating one branch of lymphatics into inverted motion, another branch is liable to absorb its fluid more hastily; suppose strong errhines, as common tobacco snuff to children, or one grain of turpeth mineral (*hydrargyrus vitriolatus*) mixed with ten or fifteen grains of sugar, was gradually blown up the nostrils."

In treating of lymphatic catarrh, *catarrhus lymphaticus*, (vide class i. 3. 2. 1.) he questions, "Could such a discharge be produced by strong errhines, and excite an absorption of the congestion of the lymph in dropsy of the brain?"

The frequency and formidable nature of hydrocephalus internus, even under the present most improved mode of treatment, is my only apology in stating to you the following case.

A child of mine, aged five years, of slender habit, was in the last winter attacked with the usual symptoms of dropsy of the brain, which, in a short time increased to a most alarming

degree. After making use of the usual means, such as one sparing blood-letting, repeated evacuations with calomel, and a repetition of epispastics, I found his situation as follows: irregular febrile paroxysms, dilated pupil of both eyes, more particularly of the right; strabismus when awake from sleep; a starting up in bed, with a wildness of countenance, and an absence of all sense of time and place; together with these, an enlargement of the whole right side of the head, so evident as to be discernible even at the first glance of the eye. In this stage of the disease, though despairing of relief, I had recourse to common Maccabau snuff, as an errhine. The effect of this, after a few repetitions, was, on every application of the remedy, a violent sneezing, followed by a discharge from the nose of a limpid fluid, at least apparently different from the usual secretions of that part, in quantities exceeding any thing of the kind I had before noticed from the use of the most powerful errhines. The discharge which succeeded a number of applications of the snuff, was so copious as to completely wet a common sized handkerchief in fifteen or twenty minutes. The unexpected effect of this article in producing so copious a discharge, and an obvious abatement of the more alarming symptoms, encouraged its continuance, until, by a gradual subsidence of all of them, he, within a few days, became wholly out of danger. The continuance of the snuff was intermitted, as the discharge lessened, and succeeded by the use of some simple articles of the stimulant class, which were pursued until his health was established. It may not be improper to note, that the disease evidently owed, at least its exciting cause, to concussion; and it is worthy of notice in this case, as a circumstance which led more immediately to the use of errhines, that the usual discharge from the nose, during the complaint, was absent, and that the air on every act of breathing, in passing over the dry membrane of the part, produced (if I may be allowed the expression) a dry whining sound, such as ever attends a want of secretion on that membrane. The general habit of this subject, which, even previously to this period, had been unusually spare, immediately assumed a degree of vigour, and, instead of constant invalidity, his health has been without exception complete.

How far the above case may go towards establishing the knowledge of an immediate association between the nasal vessels and those of the internal cranium, and between the latter and those of the external head generally, and how great a share an opposite state of these two sets of vessels may have in producing and continuing diseases of the brain, I shall not at-

tempt to decide; nor need I offer an opinion, how far the successful treatment of diseases in general, must depend on a thorough knowledge of the various associations of the several parts which compose the human body. Suffice it to observe, that if an argument in favour of the association of particular parts can be drawn from the circumstances of their contiguity, as is exemplified in the sympathy of the lower portion of the intestines with the lower extremities, of the urinary bladder with the external surface, of that surface with the stomach, of the stomach with the lungs, and of the latter with the vessels of the upper part of the trunk, neck, and face—by a parity of reasoning, we are led directly to a belief, that the same condition may subsist between the two sets of vessels now in question. The comparative fatality of diseases of the brain, renders this a subject, in physiological investigation, of no small importance; and, by a decision of it, we shall probably be conducted to an auxiliary in the increase and subduction of external stimuli, which (reasoning from analogy) promises a degree of success, if we except some cases related by Dr. Darwin, hitherto unexperienced in diseases of that organ.

ARTICLE VI.

A singular Case of HYDROCELE: Communicated in a Letter from EDWARD DARRELL SMITH, M. D. of Charleston (South-Carolina), to Dr. MILLER, dated May 30, 1801.

CAPTAIN W——, aged thirty-four years, of a robust constitution, and florid complexion, was attacked with intermitting fever in the latter end of March. The paroxysms assumed no regular form, and in a few days were nearly subdued by the common remedies. From the commencement of his indisposition he had found some difficulty in passing urine, amounting at length to an almost total obstruction. Upon making a violent effort, a substance was expelled with considerable force, which he described as cutting the urethra, and followed by some blood; but it being night, the nature of the substance could not be ascertained. In the course of the succeeding week, he discovered that the scrotum began to tumify, and the urine to be diminished in quantity. Alarmed by these appearances, he applied for assistance to Dr. Stevens, on the 9th of April. At this time the swelling was not great, but

the dysury was considerable, and attended with fever. Diuretics were administered without affording any relief. Mercury was then prescribed, with a view to excite the absorbents into action, and carry off the effused fluid in that manner; but the tumour continued to increase, and all the other symptoms to be aggravated until the 14th, when they became extremely urgent. The body was costive, the pulse quick, tense and small; no water had been voided for forty-eight hours; the scrotum enlarged to the size of a man's head; the penis amazingly tumefied; the pubes and thighs hard and swelled, and all the parts much inflamed. A cathartic, given early in the morning, produced several evacuations by stool, and somewhat relieved the patient; but the distress was still so great that it was resolved to evacuate the fluid contained in the scrotum by an operation. In the afternoon I visited the patient, by invitation, with Dr. Stevens. Upon examining the parts, we found that in the most depending portion of the scrotum, on the left side of the raphe, a gangrenous spot, of the size of a dollar, had made its appearance, although not visible in the morning. In this spot a lancet was introduced to a considerable depth, and the puncture enlarged afterwards, without the patient's being at all sensible of the wound. A viscid, glairy matter was first discharged, then a little blood, and, lastly, yellow water; all of which were extremely offensive. The contained fluid did not escape so freely as was expected; and after discharging a little more than an half pint ceased to flow. On going to stool several times, the patient observed the matter to run more freely, and while in bed it continued to be discharged gradually; the next morning the 15th, Dr. David Ramsay was called in consultation, and, on visiting the patient, it was found that he had passed a good night, his fever less, body open, and nearly a pint of urine voided at once through the penis. The tumour was somewhat lessened; but as the gangrenous appearance was alarming, it was agreed to administer the decoction of bark freely, the body being also kept open. In the evening the symptoms still more abated, and water passed freely four times in the course of the day. Solutions of sacch. saturni were directed to be applied constantly to the inflamed parts. On the 16th and 17th the fever had disappeared, and every other symptom was favourable. On the 18th, the gangrenous portion appeared disposed to slough off. The discharge having stopped, the puncture was enlarged considerably—penis nearly reduced to the natural size. On the 19th the opening was still more enlarged, when the fœtor became more sensible; a portion of

cellular substance protruded and was removed—directed to take the bark in substance every two hours; in the afternoon a part of the gangrenous portion sloughed off, and was followed by a considerable discharge. From this until the 25th he continued to grow better; the gangrenous portion sloughed off entirely, leaving a considerable cavity. The penis was now in a natural state, and the hardness and swelling of the pubes subsided. About this time a number of boils broke out on his left thigh, near the groin, which occasioned considerable pain, but went away in a few days. Common dressings were applied to the scrotum, and granulations having filled up the cavity by the 14th of May, the patient was declared well. The bark was continued until within a few days of this period. Where the wound was, the scrotum does not appear as in other parts, but there is a small pit, or depression occasioned by the cicatrix; the testes do not appear to have suffered any injury.

In forming a conjecture concerning the nature of this extraordinary tumour, we were involved in much perplexity. The history of the case precluded the idea of its arising from any venereal affection, hydropic diathesis, hernia, &c. There was but one mode in which this swelling could probably have been produced, viz. an opening from the urethra into the scrotum, affording a passage for the introduction of some fluids. The attending circumstances warranted this conclusion. The patient had been afflicted previously with symptoms of gravel, but had never passed any particles of that nature. The difficulty of voiding urine for some days before, and the pain and cutting at the time of the expulsion of the substance which appeared to be the occasion of the tumour, induced us to suppose that this substance was of a calculous nature, and in its passage had abraded the urethra so much that the urine found its way through some part into the scrotum. This opinion is corroborated by the fact, that, during two days of entire suppression, the scrotum increased enormously; but after an external opening was made, and the urine began to flow through the natural channel, the swelling never became larger, although the discharge was very slow and gradual.

It may not be amiss to remark, that the patient has not since been troubled with any symptoms of gravel, or difficulty of passing urine.

ARTICLE VII.

On the TOPOGRAPHY and DISEASES of GREENEVILLE, on Tar-River (North-Carolina): Communicated by Dr. G. PILLSON, of that Place, to the Editors of the Medical Repository.

GENTLEMEN,

AS coinciding with the plan of your valuable publication, and in some degree supplementary to the observations of Dr. Williamson, in vol. ii. p. 145, second edit. of the Medical Repository, "On the ill Effects of Blood-letting in Putrid Bilious Fever and Pneumonia Typhoides, as they appear in North-Carolina," I have ventured to transmit to you a narrative of the febrile complaints which have occurred in this town and the vicinage thereof, as far as my practice and knowledge have extended, since July last. Young in the practice, and so immediately under the eye of many practitioners of celebrity and talents, I felt a diffidence in the attempt, not otherwise to be overcome than by a recollection of the neglect under which the subject has lain since Dr. Williamson's notices thereof, and the probability of its exciting a further attention in some gentleman of the faculty of longer experience and more accurate observation; thereby providing for the younger practitioner hereafter some practical hints for his conduct not to be found in the systems of physic of the schools.

With a view of preserving some method, I shall premise such a description of the local and relative situation of the town as may come immediately within the object of a medical essay.

Greeneville is a small town on the south side of Tar-River, built on a pleasant spot of considerable elevation, and nearly insulated by the river, and two branches on the east and west sides of the town, whose sources are but a short distance apart. The land on the north side of the river is low, broken by ponds, and subject to be overflowed during a fresh, which occurs five or six times a year, and to such extent as to cover the low land half a mile distant from the bank. The branches are constantly supplied with water from a variety of springs which issue from their high banks, and also receive the river water during a fresh. Their miry state, in many places,

renders them dangerous to cattle tempted in by the tender grass they afford in the spring. The low grounds immediately opposite to the town are yet in a state of nature, except a field of three or four acres, which, since it has been cleared, is considered to affect the health of the inhabitants situated nearest to the river. South of the town, and nearly a mile distant, is a mill-pond, the dam of which accidentally got broken during the summer, by which a considerable extent of its muddy bottom and decaying trees were exposed to a hot sun for nearly two months. The land between the town and this mill-pond is mostly under cultivation. The usual complaints of the town and country are not distinguishable, in general, from those of other low parts of the State, in the same season of the year; however, I believe the fevers of the last year have been more particularly marked.

Early in July the dysentery made its appearance in a house farthest removed from the river. The first attacked was a female eighteen or twenty years of age. I attempted the cure according to the old mode, so often and repeatedly recommended by medical writers—namely, by first evacuating the stomach by a full dose of ipecacuanha, and afterwards exhibiting small doses of rhubarb and ipecacuanha, occasionally interposing an opiate to mitigate pain. The exhibition of the rhubarb and ipecacuanha did not answer the good purposes I expected from their use, constantly keeping the stomach in a state of nausea, and failing to keep up a regular and easy discharge by stool. Other purgatives were used accordingly, as salts, castor oil, &c. Having perused Dr. E. Miller's essay on the Cholera Infantum, I was induced to try the combined effects of calomel and opium. I therefore prepared pills, composed each of three grains of the former and one of the latter, with directions for the use of one every sixth or eighth hour, according to their effects. The operation of these perfectly answered the indications of cure in this disease; viz. a free and regular discharge of excremental matter from the intestines, and a relief from violent pain. A continuance of their use for six or eight days completed the cure, without the aid of any other remedy except occasionally directing magnesia for an acidity of the stomach, and the use of lime-water with an equal proportion of milk. Milk was used early in the complaint, by the advice of a friend, and constantly adhered to, from the relief experienced in its use as a demulcent, especially when churned until butter began to appear, and it was thus drank without separation.—Her three brothers were attacked

in succession, and each began the use of the calomel and opium on the first appearance of disease, and with the same happy effect. The disorder did not, however, appear in any other family in town; to which its remote situation, and the dread of infection thereby preventing a free intercourse of the inhabitants, contributed; and by the last of the month no traces of it were to be found.

The four succeeding months were distinguished, as usual, by a prevalence of bilious intermitting and remitting fevers. The most distressing symptom in each was a severe pain of the head, in some cases so violent as to amount to constant delirium; nor do I recollect a single patient exempted from it; and most commonly accompanied with an insupportable pain of the back, the seat of which was the lumbar region. The head was invariably relieved by the application of a blister on the back of the neck and between the shoulders; nor could its use be dispensed with, as no other remedy would afford such effectual relief. A free evacuation of bile, by the use of jalap and calomel, when the stomach would retain them, relieved the violence of pain of the back, and abated the febrile commotion. The discharges by stool were remarkably dark coloured, putrid and offensive. From frequent observation I am induced to believe that purgatives sometimes evacuate but one portion of the intestines; as, in many cases this fall, on the exhibition of the first purge, the first discharges have been the excremental contents of the rectum, whilst the last evacuations were of yellow bile, as if immediately poured into the duodenum. A repetition of the purgative, in the course of twelve or sixteen hours, has procured a discharge of black offensive bile, to evacuate which completely has required the exhibition of a third dose. This I have explained to myself, by supposing that portion of the intestines where the bile accumulates and undergoes the putrefactive process to be thereby affected with a kind of torpor or insensibility* to the action of cathartics, unless of the drastic irritating kind, and frequently repeated: hence more beneficial effects result from the use of jalap, calomel, scammony, aloes, gamboge, resin of jalap, &c. than from those of milder operation. It may be here observed, that notwithstanding the multiplicity of cases which occurred this fall, the mortality was but small. One patient only I lost.

* In consequence of the operation of the septic acid evolved during the putrefactive process.

The complaints during the winter were mostly of the breast and lungs. Coughs and colds were generally complained of. Pleuritic cases continued to occur, frequently and fatally, until the latter part of March. April also afforded cases of the like kind; however, accompanied with symptoms of less danger. Recourse is not always had here to medical aid, in cases of supposed pleurisy, until towards the close of the disorder. Bleeding is generally prescribed and practised by the planters on the first attack of pain; but the unfortunate result, arising, in most cases this winter, from the loss of blood, tended to restrain the indiscriminate use of the lancet. Medical assistance, when resorted to, was found insufficient to repair the injuries consequent on a copious bleeding. Errors of this kind are not entirely confined to common bleeders: even physicians themselves have generally considered bleeding as indispensable in pleuritic pains, and performed it likewise without particularly attending to the pulse, by which, I conceive, they ought especially to be guided. The tense corded pulse, which characterises inflammatory fevers, does not always accompany the pneumonic affections so prevalent in this State during the winter and some of the spring months. On the contrary, many of those cases wherein the pains of the side, breast, back and head have been found excruciating, are accompanied by a low, sunken pulse, which certainly forbids the loss of blood.

I shall now proceed to the description of a fever which proved very mortal in this town and country, during the months of February, March and April. Dr. Williamson has noticed the vulgar appellation by which it is known, as also its scientific name.* His omission of a description of its symptoms I will attempt to supply from actual observation. The attack is most commonly in the night, and commences with an ague, in some instances violent and long continued, in others with a chilliness of some hours duration: before this is entirely worn off, a pain of the head, breast, side or back, seizes the patient, and frequently a concurrence of two or more. These continue to increase in violence as the fever

* From information I am led to think that the same combination of symptoms appeared on this river in the year 1789 or 1790, and was then known by the indeterminate name of influenza; the success in the treatment of which was proportionate to the means of cure: bleeding was generally fatal, whilst the use of blisters, warm diaphoretics and cordials, was highly beneficial. Some physicians of my acquaintance have this year designated it by the name of bilious peripneumony.

comes on, and during its progress. The pain is generally confined to the forehead, of a heaviness in which, and the eyes, the patient complains; a turgescence and inflammation of the vessels of the eye is apparent. In the most violent and fatal cases delirium takes place on the accession of the fever, and continues, with few intervals of reason, until the termination of the disease. The pain and oppression of the breast are such as usually accompany a peripneumony, but the pleuritic pain exhibits a degree of unusual violence. The cough is urgent, and what is expectorated is in small quantity, frothy, and intimately mixed with blood, so as to afford a mixture of a lateritious colour. The breathing frequent and laborious, and accompanied with a wheezing noise, as if from viscid phlegm in the trachea: this symptom continues to increase until the fatal period arrives. The stomach is affected with pain and distention, and a nausea and vomiting of bile, of different shades of colour, from yellow to the darkest green, take place at an early period; a diarrhoea soon succeeds, and sometimes precedes the vomiting. The discharges by stool are bilious, of a dark colour, nearly black, and emit a putrid offensive smell, more especially when procured by art. The bilious symptoms have invariably evidenced themselves from the first attack, and in those cases in which they predominated, the lumbar pain was most urgent. In the generality of patients the pneumonic symptoms did not display themselves before the third, sometimes the fourth or sixth day. The pulse was such as to forbid bleeding, and in those cases in which it was incautiously resorted to, on the supposition of its being of an inflammatory kind, the event was fatal. No certain prognosis of the period of time to which the fever would be protracted, could be formed. It might be observed, in general, that where the affections of the head and stomach were most violent, the fatal period soonest took place: where the bilious and pneumonic symptoms were predominant, it was protracted to the seventh and ninth days, and the probability of recovery was greater; whilst a bilious affection alone, or slightly combined with pneumony, lasted for twelve or fourteen days, and the danger was consequently less.*

* In one instance it terminated fatally in the course of sixteen hours, in another in sixty. These were both females of middle age. One patient, a man of robust make, 45 or 50 years of age, who died on the sixth day, was observed, for a short time before his death, to be affected with an eructation of fluid which he endeavoured to suppress; however, it continued in frequency and quantity so as necessarily to be discharged: and, finally,

Mode of Cure.—On this head I regret that I have nothing new to offer. When the attack is so violent, and the event so immediately fatal, as in the cases mentioned in the note, I conceive it is beyond the power of art to afford assistance, as an immediate destruction of the texture and functions of the brain, and a sudden putrefaction of the fluids seem to take place; however, I can with pleasure assert, that in many cases which came under my care, whose situations appeared almost irremediable, I have derived the greatest advantage from blistering, and evacuating the intestines freely of their putrid contents. The operation of the cathartics had a powerful effect in relieving the head, and likewise the breathing, which seemed to be impeded or rendered more laborious by the distention of the abdomen from an accumulation of bile. The expectoration I endeavoured to promote by lac ammon, squills, and small doses of emetic tartar; however, as in very few cases a free expectoration was formed, I did not imagine I derived much benefit from that discharge. The lungs were more relieved from the application of a blister on the region of the chest. Neutral mixtures and snake-root I made use of as auxiliary febrifuges, and think some advantage was derived from them in promoting the discharges by the skin and kidneys. The event of one case in particular disappointed me, as my prognosis on first sight was unfavourable. He was attacked early in the morning with a chilliness which continued four or five hours, during which there appeared a slight alienation of mind, which amounted to a total deprivation of reason on the accession of the fever. I saw him about 3 P. M. the day of attack: his pulse was quick, full and soft—eyes languid and inflamed—the extremities partially convulsed, together with a subsultus tendinum—respiration frequent and laborious, with a slight cough—a nausea, and frequent inclination to vomit. The putrid exhalation which filled the room was insupportable for any length of time. About 5 P. M. a spontaneous vomiting of bile came on, of a dark green colour, almost black: this continued at intervals through the night, and was assisted by thin diluents. Having a perfect knowledge of his habits of living and state of health previous to the attack, I deemed it unnecessary to administer medicine; however, I resolved to watch the issue of the night. About

the ejection of a large quantity of extremely black fluid in a curdled state, and answering nearly to the description of the matter of black-vomit, as occurring in yellow fever, closed the awful scene. These were the only deaths in town.

At midnight a perspiration came on, when reason returned. The vomiting subsided as the discharge by the skin returned. About 8 A. M. a dose of jalap and calomel was administered, which emptied the intestines freely of a quantity of putrid matter. In the evening, with a return of strength, returned also an inclination to sacrifice to his favourite deity (Bacchus): he accordingly struggled to the temple, poured out his libations, and returned to his room. Although labouring still under a constant low fever, and slight delirium at intervals—laborious respiration, cough, and expectoration of frothy matter tinged with blood, he exerted himself to totter from his room three or four times a day, and procure his dose of diffusible stimulus. This course he continued until his health was re-established, with the precaution of abstaining from food until prompted thereto by a healthy appetite. Although I consider the conduct of this patient as hazardous in the extreme, I am confident it saved his life. The accurate Dr. Jackson, in his Treatise on the Yellow Fever of the West-Indies, says, “I have heard of some well attested instances, where plentiful draughts of rum and water have checked the vomiting, and apparently saved the lives of patients, after the medical people had given them up for lost.”

I shall forbear theorizing on the cause and nature of this endemic, as theory sometimes bewilders both writer and reader: nor dare I insist on a particular mode of practice, as this must vary according to the nature of the fever. I am not particularly attached to any system of physic, yet endeavour to cull from all, recollecting a liberal observation of the celebrated Dr. Cullen to his pupils (of whom my preceptor was one), to this effect: “That he did not deliver his doctrine as implicitly to be adhered to by his hearers, but rather as a text on which to enlarge, or foundation on which to raise a superstructure.”—I have used the lancet freely and successfully in cases of pleurisy and peripneumony, and expect so to do again, if the nature of the fever justifies its use: however, my own experience, and the communications of others, experienced medical friends, will hereafter render me more particularly cautious and observant.

Since the last of April there has been an almost entire exemption from febrile complaints.

I am, gentlemen,

With sentiments of respect, &c. &c.

G. PILLSON.

June 12, 1801.

ARTICLE VIII.

An ACCOUNT of FEBRILE DISEASES, as they have appeared in several Towns in the County of Cumberland, District of Maine, from January, 1800, to January, 1801: Communicated by Dr. JEREMIAH BARKER, of Portland, to Dr. MITCHILL.

IN the months of January and February, an inflammatory fever, attended with a sore throat, prevailed in several towns, among adults as well as children. Some account of this distemper is printed in the third volume of the Medical Repository, page 364.

During the months of March, April, May and June, the mumps and whooping-cough were very prevalent, frequently attended with considerable fever. The mumps was attended with painful indurated swellings in the neck, which, in some instances, terminated in suppuration. The whooping-cough was very obstinate, and often proved fatal to children under a month old.

In the month of July several cases of highly inflammatory fever occurred. The weather was unusually hot and dry. The thermometer rose to 90 several days.

On the 11th of July, a young man, of a full habit, in Cape-Elizabeth, was attacked with great pain in his head and limbs, but particularly in his legs, the muscles of which were spasmodically affected. The whites of his eyes were as red as blood. His face was purple. His thirst for water was great. Fainting fits occurred whenever he was raised up in bed. He had no chilly fits, nor disturbance in the alimentary canal. On the first day of his attack a profuse hæmorrhage issued from his nose, as also on the second and third days. After this the pain in his head and limbs, redness of his eyes, and purple colour of the face, were removed. Paleness succeeded.

The above account I had from his nurse, who supposed that he had lost a quart of blood.

On the fifth day, when I was called, the whites of his eyes, and whole body, had acquired a deep yellow hue. His urine was of the same colour. He had a quick pulse, a moist and white tongue, and considerable thirst for water.—These symptoms subsided on the ninth day, and he recovered.

Previously to his attack he had been exposed to great heat in confined air.

In the latter part of the month the fever was ushered in with nausea, vomiting, and chilly fits. Cases of this description terminated favourably, in about ten or twelve days, upon the evacuating and alkaline plan.

From the first of August to the middle of September, the *cholera morbus*, as it is termed, was remarkably prevalent in many towns, chiefly among children. Indeed, the distemper was more prevalent and malignant in this part of the country than ever it had been known to be before by the oldest inhabitant among us.

The vomiting and purging were frequent, which readily induced great prostration of strength. The matters ejected from the stomach, in the progress of the disease, were sometimes so corrosive as to excoriate the throat and mouth. The intestinal discharges were often tinged with blood, and tenesmus was frequently a very troublesome symptom. Adults, and others, who could describe their feelings, complained of great pain, heat and anguish in the stomach, and a sense of soreness upon the abdomen, which was often tense. A remitting fever, with a quick pulse, and thirst, also attended.

Two modes of practice were pursued in this disease. One mode was to exhibit cathartics, as rhubarb and calomel, castor oil, &c. followed with opiates. By these means temporary relief was obtained, and the disturbance in the alimentary canal was often considerably allayed for several days. These circumstances afforded hopes of a favourable termination. After this respite, however, the vomiting frequently returned, the contents of the stomach having acquired a dark green hue, and a great degree of virulence. The febrile disturbance increased, and a rapid decay of flesh and strength ensued; so that the patient generally expired in a short time, or the state of convalescence was very long and tedious.

The other mode of practice consisted in the administration of emetics, cathartics, alkalines and oils, as also of opiates. This mode of practice was evidently attended with much greater success.

With respect to emetics, they appeared to me to be generally indicated. Indeed, I did not think it warrantable to risk a case unless the stomach was thus cleansed. Spontaneous vomiting afforded very little relief, seldom discharging any thing in the beginning of the disease, excepting the matters taken into the stomach. An emetic, however, ejected a quantity of green matter, which repeated cathartics, upon trial, could not remove. Neither did emetics induce that degree of de-

bility which followed cathartics. On the contrary, the patient revived, and the stomach appeared to be invigorated by the operation of a suitable vomit. This was verified in many cases, even where the principle of animation was so far exhausted that the pulse could scarcely be felt.

With a view of rendering an emetic still more efficacious, I adopted a practice of working it off with an aqueous solution of alkaline salts. Four or five grains of sal. absynth. were accordingly given to a child of two or three years old, in warm water, immediately after each discharge by the vomit; and fifteen or twenty grains to an adult.

These alkaline draughts served, as I conceived, to obtund or neutralize the virulent matter in the stomach, and disarm it of its corrosive power; for by this means the anguish at the stomach more readily abated, and the matters ejected became much less offensive. In not a single instance did the vomiting return when the stomach was cleansed in this manner—cases of relapses from improper food excepted; but when an emetic was administered in the usual way, the vomiting frequently returned.

The speedy and radical cures which were effected by seasonable emetics, worked off with the alkaline solution, induced me to place great confidence in this mode of procedure.

When the stomach, however, was not seasonably and properly cleansed, the virus of the disease soon extended its baneful effects beyond the alimentary canal, producing febrile disturbance and thirst; and, in some instances, a very sore mouth.

Under these circumstances, the stomach and intestines being previously evacuated, alkaline salts, absorbent earths, lime-water and oils, as also alkaline enemas, were productive of the happiest effects: for, under a liberal use of these articles, many severe cases terminated favourably, while, among others, apparently much milder, in which these remedies were omitted or neglected, the disease often proved fatal. Such neglects were frequently occasioned by the inattention of nurses, or difficulty of exhibiting these articles to young children.

After the virus of the disease was so far subdued, by these means, that the anguish at the stomach, and fever, had abated, opiates and other stimulants were employed to advantage; but while the morbid stimulus continued to exert its deleterious power to any considerable degree, stimulants were generally offensive to the stomach, and evidently excited the fever.

The food most congenial to the stomach, during the disease, was Indian gruel and rice. Cold water was the most desirable drink, and always afforded great refreshment. In the convalescent state, salted pork was eaten with impunity, and proved to be agreeable nutriment. Fresh beef, however, produced relapses in several instances, exciting vomiting, purging, and febrile disturbance. The matter ejected from the stomach was of a dark green colour. The stools were of a similar hue, and very foetid. The abdomen was tense, and the fever, as well as thirst, was considerable. In some of these cases medical aid was interposed in vain. Alkalines, however, had astonishing effects. They seemed to put a stop to putrid fermentation in the alimentary canal as readily as they do in any other receptacle of putrescent matters, and removed the foetor; so that, when the patient was not too greatly exhausted, or a lesion of organs had not taken place, recoveries, by a liberal use of these means, were effected.

From the middle of September to the first of November a low remitting fever prevailed, attended with cough, and a copious expectoration of matter. When medical aid was not seasonably called, the fever was frequently protracted to thirty or more days. In some of these protracted cases the disease proved fatal. But when seasonable assistance was called, and alkaline remedies were duly employed, the fever gradually subsided, and ceased in twelve or fourteen days. The appetite then returned, by the use of tonic bitters, and the patient recovered.

During the months of November and December general health prevailed.

A few cases and remarks will close this account.

On the 2d of August, a child, in a country village, two years old, was attacked with the usual symptoms of a mild cholera, and managed wholly by its nurse. Occasional doses of rhubarb, as also of elixir paregoric, were given. The child remained in a pretty quiet state for several weeks. On the 10th of September I was called, and found the patient emaciated to a mere skeleton, labouring under a low remitting fever, cough, and a very sore mouth. The stools were frequent, and of a dark green colour. The patient died a few days after.

In many cases of this kind, where the poisonous cause was not counteracted, the disease proved fatal.

On the 10th a middle aged man was attacked, in the evening, with great pain, heat and anguish in his stomach. I was

called in the morning, and found him greatly exhausted. He had vomited, as he said, more than twenty times, and purged as often. His stools were very slimy, and considerably tinged with blood. I gave him an ounce of olive oil, and thirty drops of laudanum, which alleviated his pain in some measure, and checked the discharges. In about six hours, however, the vomiting and purging returned; the pain increased, and he became feverish and thirsty. His abdomen was very tense, with a sense of soreness. I then gave him two grains of tartar emetic, which operated six times; and an aqueous solution of alkaline salts was given after each of the vomitings. The tension of his bowels, and other symptoms, then subsided; so that the next day he was able to walk abroad.

I met with many very similar cases among children as well as adults; and when an emetic was given within twenty-four hours from the attack, and conducted in this manner, the disease was generally eradicated without the use of any other means.

On the 12th a child of three years old was seized with severe cholera. I was called on the third day. The vomiting and purging had been frequent from the attack. The pulse was very quick, and the thirst great. After cleansing the stomach with ipecacuanha, worked off with the alkaline solution, the discharges ceased, but the quickness of the pulse and thirst continued. Four grains of sal. absynth. and twenty of creta, were then given, once in two hours, and an ounce of lime-water as often. The fever and thirst ceased in three days, and the appetite returned. Eight days after the child suffered a relapse, in consequence of eating fresh beef, and the vomiting, as well as fever, returned. The abdomen was tense, and the stools were very foetid. By a renewal, however, of the alkaline remedies, the complaints were soon removed, and the patient recovered. Several other cases of relapses, in consequence of eating fresh meat, occurred; and when alkalines were not exhibited, the putrefactive process in the alimentary canal soon destroyed life.

On the 8th of September I was called to a young man, of a full habit, in Cape-Elizabeth, who complained of a pain in his head and back, as also of drowsiness. The whites of his eyes, and whole body, were of a deep yellow colour. His tongue was white, and he was thirsty. His pulse was full, though not much quicker than natural. His bowels were costive, and he disrelished every kind of food. The preceding day, as his nurse informed me, his face was remark-

ably red, and his thirst great. A pint of blood was drawn, and his pains were alleviated. His stomach and intestines were evacuated, and a blister was applied to his neck. Alkalines were prescribed, as also calomel.

As the disease advanced his drowsiness increased; so that, after the fifth day, he did not incline to open his eyes, speak or move. A low delirium succeeded; and, on the seventh day, he was attacked with hiccough. His stools, at this time, were very black, foetid, and involuntary; and his skin had acquired a copper colour. On the eighth his respiration became laborious, and on the tenth he expired.

Very little medicine was exhibited during his sickness, on account of a suspicion, which the nurse entertained, of the disease being catching.

Three days before the accession of these symptoms he was exposed to the effluvium of raw hides, in a state of putrid fermentation, which excited nausea and vomiting. These hides were brought from the West-Indies to Bath, on Kennebeck River, packed in casks, and opened upon a wharf. Four other men, who assisted in unpacking these hides, and two women, who happened to be near, suffered a very similar attack, as I have been informed by their attending physician. Some of these patients, however, he observed, were attacked with violent and continued vomiting, quick and disturbed pulse, as well as with a yellow skin. Four of these patients died. A man who washed the clothes of the deceased at Bath was also attacked with very similar complaints, and died.

It is worthy of remark, that from none of these patients in yellow fever has the disease been communicated.

On the 12th I was called to a young man who was attacked, eight days before, with the usual symptoms of cholera. His vomiting had ceased, but the diarrhoea continued. He complained of great uneasiness and anguish at the stomach. He was affected with a remitting fever, quick pulse, and hurried respiration. His tongue was unusually red, and he was very thirsty. Two grains of tartar emetic were now given, which ejected, by vomit, dark green matter of a very offensive smell, although he had taken several cathartics. He vomited several times, and the alkaline draughts were exhibited as usual. His stomach and lungs were then greatly relieved. After this, twenty grains of sal. absynth. with thirty grains of calcined oyster-shells, were given once in two hours, and two ounces of lime-water as often. The febrile disturbance

gradually subsided, and ceased in five days. His appetite soon returned, and he recovered.

In some cases, where the degree of putrid fermentation in the alimentary canal appeared to be greater, and where the febrile cause had become more concentrated or virulent, the alkalines were given in larger quantities with impunity, and evidently to very great advantage.

In tenesmus, which sometimes greatly molested the patient, I directed alkaline salts in clysters, and they readily afforded relief.

Besides the beneficial effects derived from the use of alkaline remedies in febrile diseases, I have, for a few years past, found them to be of singular efficacy in certain surgical cases, as well as in other maladies.

Six years since, a peasant, in a neighbouring town, was afflicted with painful cancerous tumours in his face, which discharged a very corrosive humour. Several of these tumours were extirpated with the knife; and mercury was employed, both externally and internally, as well as cicuta, with a view of correcting this humour, and of disposing the sores to heal. The sores, however, would not heal upon this plan. Indeed, the humour increased in degree of virulency and corrosive power, notwithstanding that the external applications were reinforced with vitriols, lead, various unguents, and even *arsenic*.

He remained for a considerable time in this forlorn condition—laid aside all means, and considered his disease as irremediable.

I then directed a strong lixivium of wood-ashes to be applied. This readily stopped the progress of the corroding humour, alleviated his pains, and allowed the sores to heal. By this mean the cancerous humour was subdued, and rendered harmless; so that, in a short time, the ulcers healed, and a radical cure was effected.

Since this event, it has become a common practice, in this part of the country, not only among physicians, but others, to eradicate cancers, with a strong solution of pot-ash, as well as with the lixivium of ashes.

This lixivium is made by boiling a gallon of common ley down to a pint. A dossil of lint, impregnated with this ley, and applied to the cancerous tumour, soon alleviates the pain, and converts it into a black lump, which, by a common digestive poultice, readily separates from the sound flesh. The sore then heals by a simple dressing.

In the course of my practice, several cases of mortification or gangrene, chiefly of the extremities, have occurred. The disease was first manifested by a small painful tumour of a dark crimson colour. The part soon swelled to a considerable degree, and the anguish extended, in red streaks, to the body. The vital functions then became affected, and life readily escaped, notwithstanding that cataplasms, fomentations, vinegar, lead and opiates were employed, as also depletion.

The last fatal case which came under my notice was in August, 1795. The complaint took place on the lip, which soon swelled to a considerable degree. The whole face also became tumid, and acquired a livid hue. The throat and vitals then became affected, and death took place in ten days from the attack. In this case there was a small pimple upon the lip, which was irritated the day before the pain and anguish took place.

I have lately met with two cases of these painful tumours upon the fingers, where the parts had sustained no injury. The anguish soon extended above the elbow, assuming a formidable appearance. In these cases I directed the lixivium of ashes to be applied. By this mean the pain and anguish soon abated, digestion took place, and the disease was removed.

About two years since, a seaman, in this vicinity, who had been exposed to noxious air, and fed with bad provisions, in the West-Indies, was afflicted with corroding ulcers in his legs. A very similar mode of practice was pursued, which was first adopted in the cancerous case of the peasant. No benefit, however, was experienced by this mode, although it was persisted in for nearly twelve months. This patient also despaired of a cure; but, accidentally meeting with a physician from the State of New-York, he was directed to wash his legs with an aqueous solution of pot-ash, and to make a liberal use of the same internally. By this mode of practice the ulcers healed in a few weeks, and his legs were restored to soundness.

Three years ago, a man who had been troubled with rheumy eyes, and inflamed eye-lids, for nearly twenty years, applied to me for advice. He had employed the common eye-waters of vitriols, lead, &c. but to no benefit. I directed him to make use of pure lime-water as a collyrium. This, in a few weeks, removed the disease, which has never, as yet, returned. Since that period I have generally prescribed this article as a collyrium, and find it to be much more efficacious than any other remedy I have heretofore used.

152 *Efficacy of Argentum Nitratum in Epilepsy.*

I have employed alkaline remedies in several cases of *scrophula*, both externally and internally, to very great advantage.

A physician in Portland informs me that he has lately cured a violent *erysipelas* by a lotion of an aqueous solution of alkaline salts, and with surprising quickness.

Venereal chancres have easily been cured, by me and some of my brethren, with alkalines; and *gonorrhœa virulenta* has readily been removed by injections of these articles.

The successful treatment of these cases with alkalines appears to me as but a prelude to the great improvements which will, in future, be made in the art of surgery, by a free and extended use of similar applications.

ARTICLE IX.

A CASE of EPILEPSY, in which ARGENTUM NITRATUM was successfully exhibited: Communicated by L. J. JARDINE, M. D. of Philadelphia, to the Editors of the Medical Repository.

Philadelphia, July 4, 1801.

GENTLEMEN,

IN August last I was desired, by a gentleman who resided about six miles from this city, to visit one of his servants, a white boy, ten years of age, who was much afflicted with epileptic fits. When I visited him I recollected that, during my attendance in the family a short time before, I had noticed a peculiarity in his countenance and manner, which appeared to me to be the effect of natural imbecility of mind. Upon inquiry, I was informed that, previously to the attacks of epilepsy, no such defect had existed, but that he had always discovered as much smartness and intelligence as boys of his age usually do; that the first fit took place in the preceding spring, without any *apparent* exciting cause; that this was followed by several others at very irregular intervals, and that his mind was obviously much debilitated by every paroxysm.

Being fully satisfied that, in many diseases, the operation of stimuli is rendered much more efficacious by previous depletion, I took from him eight ounces of blood, ordered him a

rathartic; and directed spare diet for a few days. I then prescribed stramonium, with a return to his former diet. The stramonium could not be procured; which, on reflection, I did not regret, as it has been observed, that in those cases of epilepsy in which the *mental powers* are much affected, this medicine is administered with little or no advantage. I then had recourse to the nitrate of silver, a preparation which has been proved, by the experiments of Dr. Cappe, of York, to possess a most extraordinary influence both upon the nerves and muscles. For the first week he took half a grain twice a day, and afterwards two grains per day for about two months. During the two first days the medicine produced a purgative effect, which spontaneously subsided. About three weeks from this time he had a fit which, in violence and duration, much exceeded all his former ones; and, in one week after this, another somewhat less violent. Experience having proved, that during the use of this remedy, the aggravation of the disease, at first, is almost a certain prelude to its total removal, I was induced, by those two violent attacks, to prognosticate a favourable event. Shortly after the last paroxysm which I have mentioned, a visible improvement took place in his countenance and general system, and his medicine was, without my advice, soon discontinued. Upwards of ten months have elapsed since his last fit, and he now exhibits the appearance of the most perfect health, both of body and mind.

With the strongest wishes for the success of your valuable Repository,

I am, Gentlemen,

Your obedient, humble servant,

L. J. JARDINE.

ARTICLE X.

OBSERVATIONS and EXPERIMENTS relating to the PILE of VOLTA: In a Letter from Dr. J. PRIESTLEY to Dr. WOODHOUSE, Professor of Chemistry in the University of Pennsylvania.

DEAR SIR,

HAVING been favoured, by Mr. Weatherby Phipson, a young man of Birmingham, with an excellent apparatus for repeating the experiments on the *pile of Volta*, consisting

of sixty plates of copper coated with silver, and as many thin rolled plates of zinc, which is a valuable improvement of his own, I have had great satisfaction in observing the results; and though (receiving intelligence of what is doing on the continent of Europe so late as I do here) it is probable that I shall be anticipated in my observations, I shall lay them before you, after observing that I have received the fourth volume of Mr. Nicholson's *Journal*, but am ignorant of all that has been done since the publication of it.

I cannot help expressing my admiration of the ingenuity with which many persons have pursued this most curious subject; and, in general, my results are the same with theirs, though I draw different conclusions from them, especially with respect to the modern hypothesis of the *decomposition of water*, which, though almost universally received at present, I consider as wholly chimerical, and unable to stand its ground much longer. Indeed, I perceive that doubts are entertained concerning it by several persons, and others observe that these experiments give no support to it. To me it is evident that they are very far from doing so: for though it may happen that the inflammable air, from the wire connected with the silver end of the pile, be in the proportion to the dephlogisticated air from the wire connected with the zinc end, which that hypothesis requires, it appears that the latter comes from the air that is merely held in solution in the water in which the process is made; since if, by means of oil upon the water, or a vacuum, access to the atmosphere be cut off, the whole production of air ceases. There is also no production of air when the water has been exhausted of it; and certainly no good reason can be given why, if the water itself consists of these two kinds of air, and this process be capable of decomposing it, air should not be produced from it in all these cases; both the constituent parts of the water being present, and the power of separating them being in full operation. Besides, I find that though the two kinds of air be produced, they are not always in the proportion required by the new theory, the dephlogisticated air being much less than is requisite. I have also found it not much better than atmospherical air. The inflammable air I believe to be of the purest kind.

If this inflammable air came from the decomposition of the water, the water from which it is extracted ought to contain an overplus of oxygen, either in the form of dephlogisticated air, or of acid. But the signs of acidity bear no proportion to the quantity of inflammable air produced, and can

hardly be perceived at all. I did perceive it when I made the process in water tinged with the juice of litmus, but only by the redness of the froth from the wire connected with the zinc end of the pile, the liquor itself remaining unchanged, notwithstanding a copious production of inflammable air from the other end of the wire. Also, when I introduced a piece of raw flesh instead of the metal connected with the zinc end of the pile, no air came from it; nor did I perceive that the surface of it had acquired any acidity, though inflammable air was produced in great plenty from the other wire.

But, except gold or platina be connected with the zinc end of the pile, there is seldom any production of air from that quarter, the metal in that situation being dissolved; and there is no appearance of its being dissolved by any *acid*, but, on the contrary, of its being supersaturated with phlogiston. But before I produce the evidence of this, which affords an argument against the decomposition of water that appears to me to be perfectly decisive, I shall relate some circumstances concerning this solution of metals which I do not find to have been noticed by others.

In general, wires connected with the zinc end of the pile are dissolved, but none so readily as those of silver, even when the wires connected with the silver end of the pile are of the same metal, and give air copiously. But if zinc or iron be connected with the silver end of the pile, any other metal except gold or platina, connected with the zinc end, will be dissolved. Iron and zinc were the means of dissolving each other. But the surest method of producing this solution of metal was by connecting charcoal with the silver end of the pile. I once dissolved pure gold in this manner, and I preserve the solution as an evidence of it; but I could never do it a second time, though I tried charcoal in several states, perfect and imperfect, &c. nor could I by this process dissolve platina.

Charcoal itself is not sensibly dissolved in this process, and air comes from the pieces connected with both ends of the pile. Suspecting that this air might be that which always comes from charcoal when it is plunged in water, I filled the pores of two pieces of it with water, by means of the air-pump, leaving them a long time in vacuo. Being then tried, they gave no air for some hours; but from the piece that was connected with the zinc end of the pile there proceeded a white cloud which filled part of the vessel of water: this, however, soon disappeared, the water becoming transparent

again; and, after some hours, both the pieces of charcoal gave air as copiously as any of the metals had done, and continued to do so as long.

When iron was connected with the silver end of the pile, and copper with the zinc end, the latter was dissolved, but not till after two or three hours. Zinc being connected with the silver end, and copper with the zinc end, the former gave air copiously from the beginning; but it was near two hours before the copper began to dissolve, which being a flat piece, it did at the corners and edges only, and never from any part of the flat surface. When I added more copper it began to give air without dissolving; and also some of the green precipitate, which had been formed before, gave out air, and the bubbles adhering to it rose from the bottom of the vessel to the top. This precipitate from the copper, which at first was green, became afterwards of a dark brown, as if the metal had been revived. This too was the case with one vessel in which a solution of silver had continued some time. It has given a coating to the glass that is perfectly white and brilliant.

Having introduced four vessels of water between the two ends of the pile, and having connected each two with silver wires, that leg of the wire, in all the vessels, which was next to the silver end of the pile, gave inflammable air, while, in all of them, the other leg of the same wire was dissolved. When I covered one of these vessels with oil, the production of air, and the solution of the wires, ceased in them all.

Though, as I have observed, there was a slight appearance of acidity in the water when dephlogisticated air was given out at the wire communicating with the zinc end of the pile, there never was the smallest appearance of it when the metal was dissolved. When silver was dissolved in water tinged with the juice of litmus, and there was a copious production of inflammable air from the opposite wire, I could not perceive the least change of colour in the water.

I examined the water in which the process was made, especially when silver was dissolved in it, but was so far from finding the air contained in it more pure than before, it was evidently less so. Before the process, the standard of this air, with an equal quantity of nitrous air, was 1.1; with the water made turbid and white with a solution of silver, it was 1.2; and, after standing till it became black, it was 1.3.

The black matter from this solution of silver did not contain any oxygen, but was evidently the metal supersaturated

with phlogiston; for when it was heated in dephlogisticated air it diminished it, and converted part of it into phlogisticated air; and when it was heated in inflammable air it added to the quantity of it; and this appeared, by its explosion with dephlogisticated air, to be as pure as other inflammable air; so that this black powder of silver is similar to the black powder of mercury made by agitation in water, which I have shown to be mercury supersaturated with phlogiston. Where, then, is the oxygen that ought to be produced in great quantity, if the inflammable air from the wire connected with the silver end of the pile came from the decomposition of the water?

The glass vessels in which silver has been dissolved in these processes are tinged of a dark colour, which no acid, nor any other menstruum that I have applied, will take out. This is similar to the case of flint glass becoming black by heating inflammable air in it; the calx of lead in the glass uniting with the phlogiston of the air. In this case, therefore, it is natural to infer that this calx of silver imparts phlogiston to the glass, and that there was nothing of oxygen in it. The surface of this black powder of silver, long exposed to the air while it is moist, becomes white, which is similar to the experiment with mercury, in which the black powder of this metal, produced by the agitation of it in water, becomes white running mercury as it becomes dry, diminishing and phlogisticating the air in which it is confined.

The black calx of silver, made by its solution in nitrous acid, is said, by Mr. Macquer, in his Dictionary, to be owing to the phlogiston contained in that acid. To ascertain this I dissolved some pure silver in spirit of nitre, and, evaporating the solution, I heated the residuum in thirteen ounce measures of dephlogisticated air, of the standard of 0.82, with two equal quantities of nitrous air, by which it was reduced to eleven ounce measures, of the standard of 1.72, with one measure of nitrous air; so that it was almost wholly phlogisticated air: consequently this calx of silver contains no oxygen.

My present opinion concerning the theory of this curious process is as follows:—Since the operation wholly depends on the calcination of the zinc, which suffers a great diminution of weight, while the silver is little affected, and all metals lose their phlogiston in calcination, what remains of the zinc in a metalline form in the pile, and every thing connected with that end of it, is supersaturated with phlogiston; while the

calcined part, and every thing connected with that end of the pile, is deprived of it. The former, therefore, is in a *positive* state, and the latter in a *negative* one, with respect to phlogiston; and it seems to follow, from these experiments, that this is the same thing with positive and negative electricity; so that the *electric fluid* and *phlogiston* are either the same, or have some near relation to each other. The silver seems to act principally as a conductor of electricity: for the surface of it is only blackened in some places in this process, in consequence, probably, of receiving phlogiston from the zinc; but the water is most essential to it; because it constitutes the principal part, if not the whole, of the addition of weight in the calx. Accordingly, in the calx of zinc I have found nothing but water, though it is probable that there is a small portion of oxygen in it.

These experiments favour the hypothesis of *two electric fluids*, the positive containing the principle of oxygen, and the negative that of phlogiston. These, united to water, seem to constitute the two opposite kinds of air, dephlogisticated and inflammable.

These experiments tend likewise to confirm the conjecture which I advanced in my first publication on the subject of air, concerning *the similarity of the electric matter and phlogiston*; and, together with the proper Galvanic experiments, show that the same substance, elaborated from the aliment by the brain, is the cause of muscular motion, the nerves being the most sensible of all electrometers. See the first edition of my *Experiments on Air*, vol. i. p. 274, &c.

I see no occasion to suppose, with Mr. Volta, that there is any *circulation* of the electric fluid in this pile. The calcination of the zinc supplies phlogiston as long as it continues, and when that ceases the operation of the pile ceases with it. I also see no necessity that one end of the pile should be silver and the other zinc; and when both are silver, or both zinc, the operation is the same; nor can I conceive why it should be otherwise. When the pile is properly prepared, the addition of any kind of metal to the ends only serves as a conductor of the electric fluid, and silver, zinc, or any other metal, will sufficiently answer this purpose.

Had this process succeeded without any atmospherical air incumbent upon the water in which it is made, it would have amounted to a full proof of the new theory; one part of the water being deprived of hydrogen, while oxygen abounded in the other, and both of them, with the assistance of calo-

ric (though it does not appear whence that could be supplied), assuming the form of air. But this not being the case, the element of the dephlogisticated air evidently coming from the superincumbent atmosphere, the element of the inflammable air must necessarily come from the calcined metal, which is a sufficient proof of the doctrine of phlogiston. Whether in this you will agree with me, or not,

I am, dear Sir, yours sincerely,

J. PRIESTLEY.

Northumberland (Penn.), Sept. 16, 1801.

P. S. In Nicholson's *Journal*, vol. iv. p. 326, it is said, that "the inventor of the Galvanic pile discovered the conducting power of charcoal;" whereas it was one of my first observations in electricity, made in 1766, and published in the first edition of my *History of Electricity*, in the year following. See that edition, p. 598.

Having, since the above was sent to the Medical Repository, covered the whole pile with a large receiver standing in water, when charcoal was connected with the silver end, and silver (in two vessels of water) with the zinc end, I observed that the air within the receiver began to diminish; and, after about a day and an half, the diminution was at its maximum; when I examined it, and found it completely phlogisticated, not being at all affected by nitrous air. This experiment, added to the preceding on the *black calx* of the silver, and the *water* in which it is made, completes the proof of there being no decomposition of water in this process, and strengthens the argument in favour of the doctrine of phlogiston.

Sept. 29, 1801.

ARTICLE XI.

An Account of a NEW, PLEASANT, and STRONG BITTER, and YELLOW DYE, prepared from the Stem and Root of the XANTHORHIZA TINCTORIA, or SHRUB YELLOW ROOT; with a Chemical Analysis of this Vegetable: Communicated by JAMES WOODHOUSE, M. D. Professor of Chemistry in the University of Pennsylvania, &c.

THIS shrub is called Xanthorhiza from the Greek words *ξανθος*, *flavus*, and *ῥίζα*, *radix*: it is denominated *simplicissima* by Marshall, from the supposed simplicity of its

stem. L'Heretier has given it the name of *apiifolia*, as he thought the leaves resembled those of parsley or celery; and it was formerly called *Marboisia tinctoria*, by Mr. William Bartram, in honour of M. de Marbois, an encourager of the science of Botany, and from its qualities as a dyeing drug.

As the stalks of this plant sometimes bear five branches, the specific name of *simplicissima* cannot be very proper, and its leaves do not sufficiently resemble those of parsley or celery to be called *apiifolia*. *Xanthorhiza tinctoria* is a more expressive name than any it has yet received.

The *Xanthorhiza tinctoria* is a native of North-Carolina, and was first brought from that State into Pennsylvania, about forty years since, by Mr. John Bartram, then Botanist to the King of Great-Britain, and planted in his garden at Kingsess, in the county of Philadelphia, where it has continued to flourish in a most luxuriant manner. The stems reach the height of three feet, and are generally somewhat thicker than the barrel of a goose-quill. The root is from three to twelve inches long, and about the diameter of a man's little finger, sending off numerous scions, sometimes two feet in length, by which means it spreads considerably. The leaves are placed alternately, having long petioles and pinnated, terminating in an odd one; the folioles sessile, and lacerated deeply on their edges. The peduncles are branchy, and are placed immediately beneath the first leaves, from which cause the flowers appear before the leaves, very early in the spring.

The Characters of the Fructification according to the Linnaean Arrangement.

Cl. Pentandria Polygynia.

Cal. Perianthium, none.

Corol. Petals five, equal, lanceolate, spreading, open and flat. The nectarium forms a little crown in the centre of the corolla, composed of five little bipartite leaves, one of which is placed between the base of each petal.

Stam. Five, slender and short, placed about the middle, at the base of each petal. The anthers roundish.

Pist. Germina numerous; uniting at their base; becoming smaller upwards; forming as many subulated incurved styles, each terminated by an acute stigma. These germina become as many capsules, of a figure nearly oval and compressed, enlarging upwards, and diverging from each other; all united below on the general receptacle; each containing a single roundish seed.

The stem and root of the *Xanthorhiza* are of a bright yellow colour, and possess a strong bitter taste.

The following experiments were made with different parts of the plant, to ascertain its virtues.

1. Pump-water, digested on the stems and roots in coarse powder, received a yellow colour, and tasted bitter.

2. Water, repeatedly boiled on the stems and roots, extracted the greatest part of the colouring matter.

3. The stems and roots, distilled with a gentle heat, produced some water, which contained none of the qualities of the plant.

4. One pint of alkohol, digested on half an ounce of the bruised roots, contracted a deep yellow colour, and possessed an intensely bitter taste.

5. This alkohol being filtered, gave, by spontaneous evaporation in the open air, two scruples of a yellow resinous extract.

6. One pint of alkohol and water, digested on half an ounce of the bruised roots, received a pale yellow colour.

7. This diluted alkohol, evaporated to dryness, left thirty grains of extractive matter.

8. Water, added to the tincture of the stems and roots in alkohol, rendered it muddy.

9. Pieces of silk, cloth, flannel, cotton and linen, were boiled in a decoction of the powdered stems and roots. The silk received a bright yellow colour, the cloth a drab, the flannel a pale yellow, and the cotton and linen would not take the colouring particles.

10. This silk, cloth and flannel, were exposed, twenty days, to the action of the solar light, in a temperature varying from 105 to 115 deg. of Fahrenheit's thermometer, along side of other pieces of the same kind of stuffs, dyed with fustic, saffron, and turmeric.

In a few hours the light and oxygen of the atmospheric air altered all these colours a little, except that of the cloth. The colouring matter of the turmeric first disappeared, then of the saffron—that of the *Xanthorhiza* stood nearly as well as the fustic.

11. Pieces of silk were boiled in the following mordants: Solution of alum; alum and pot-ash, or sulphate of pot-ash and alumine; cream of tartar and alum, or tartrate of alumine and sulphate of pot-ash; saccharum saturni and alum, or sulphate of lead and acetate of alumine; and the murio-sulphate of tin. They were then dyed with the *Xanthorhiza*, and re-

ceived different shades of yellow. Other pieces of silk were also boiled in the same kind of mordants, and dyed with quercitron bark, weld, fustic, turmeric, saffron, and the roots of *hydrastis canadensis*, the simple tincture of which imparts to silk a rich and superb yellow colour. The whole were exposed to the light of the sun, in atmospheric air, twenty-seven days, in a temperature varying from 100 to 115 deg. of Fahrenheit. The colouring matter of the turmeric and saffron was the most fugitive. The silk dyed with quercitron bark, with *saccharum saturni* and alum, for a mordant, stood best. The others contracted a brown cast, except the weld, which had faded.

12. A portion of the roots grated, mixed with a small quantity of water, strained through a rag, and evaporated to dryness in the shade, produced a yellow extract, which was mixed with a portion of alum.

13. Paper was coloured yellow with this preparation, and green by mixing it with Prussian blue. This paper was exposed to the light of the sun in a temperature of 105 deg. of Fahrenheit, along side of other paper, stained in a similar manner with gamboge. In a few hours the yellow and green of the *Xanthorhiza* were considerably altered for the worse, while those of the gamboge were not affected.

14. The leaves, stem, and roots, separately burnt in the open air, yielded ashes, to which warm water was added. The water being filtered, and evaporated to dryness, produced a small quantity of pot-ash. Some silicious and aluminous earth remained on the filter.

15. A handfull of the leaves, exposed three hours to the influence of the solar light, in forty ounce measures of pump-water, gave twelve drachm measures of oxygen gas, which devoured nearly three equal measures of nitrous air.

16. A green tincture of the leaves in alcohol was exposed in a dark place, and to the light of the sun, in atmospheres of oxygenous, azotic, and hydrogen gases. That which was placed in the oxygen gas, in the light, in a few days contracted a yellow, and afterwards a red colour. No alteration was produced in the rest.

17. A stem, two feet long, was placed in a solution of nitre, and of the sulphates of iron and copper. All these agents were taken up by the absorbents of the plant, and deposited in the leaves. The iron was detected by placing the stem in the distilled acid of the unripe fruit of the *Diospyros Virginiana*, or persimmon tree; the copper, by putting it in

ammoniac, when the leaves were turned of various shades of brown. The presence of the nitre was shown by setting fire to the leaves, when they burnt like paper soaked in a solution of this salt.

It appears, from these experiments, that the *Xanthorhiza tinctoria* contains a gum and resin, both of which are intensely bitter; the resin being more abundant than the gum. From the small quantity which is obtained from half an ounce of the stem and root, by one pint of alcohol, it is probable that part of it is carried off in the vapour of this volatile fluid.

It imparts a drab colour to cloth, and a handsome yellow to silk, but the dye will not take on cotton or linen, as the colouring particles have no elective attraction for these stuffs. The different mordants which were used altered the shade of the yellow colour considerably, but did not appear to render it more permanent. While every shade of this elegant colour can be obtained from that truly valuable dyeing drug, the quercitron bark, I think it will always supercede the *Xanthorhiza*, and every other native yellow dye, among which that of the *hydrastis canadensis* may justly be reckoned the most superb.

The watery extract of the grated roots, mixed with alum, and added to Prussian blue, was first used by Mr. James Bartram, for colouring plants, and the plumage of birds, of a green colour. The green is far more lively and elegant than that made with gamboge and Prussian blue, which is generally used for painting in water colours, and stands well in the shade, but soon contracts a dull colour when exposed to a bright light, and to a high temperature. Various subjects, coloured by this green, one year since, and inclosed in a book, are as lively at this time as when first painted.

The leaves, exposed in pump-water to the light of the sun, afforded air of a high degree of purity. This air arises from the decomposition of the carbonic acid which is contained in most water. The carbon of this acid unites to the leaves, while its oxygen is set at liberty. As no pure air can be obtained from these, or any other leaves, in distilled river, rain or lime water, and as, from numerous experiments, I never could find that they purified common atmospheric air, when inclosed in it, and exposed to the light of the sun, unless it contained fixed air, I believe the opinion which is almost universally adopted, that they give to man oxygen gas in any considerable quantity, and that he yields them *azotic* air in return, to be totally false.

164 *Account of a new, pleasant, and strong Bitter, &c.*

The colour of the leaves appears to reside in a resin, which is altered by the combined action of light and oxygen, by either of which, separately, it cannot be affected. Vide experiment 16.

Nitre, the sulphates of iron and copper, ammoniac, and the gallic acid, were taken up by the absorbents of the stem, and carried to the leaves. The hyperoxygenated muriate of pot-ash is an excellent agent to demonstrate these vessels in the leaves of some trees, as those of the *Franklinia alatamaha*, *Corylus avellana*, &c. when they become of a deep brown colour. When a leaf of *Liriodendron tulipifera* was impregnated with nitre, and set on fire, it burned principally along what have improperly been called the nerves of the leaf, but which are now known to contain absorbent vessels.

As the *Xanthorhiza tinctoria* is a strong and pleasant bitter, and very nearly allied to the celebrated columbo root, it promises to become a valuable addition to the American *Materia Medica*. It is preferable to all our native bitters. The bark of the root of the *Aristolochia siphon*, or Dutchman's pipe, which is often made use of by the inhabitants near Pittsburgh, is a weak aromatic bitter. The root of the *Actea racemosa*, black snake-root or rich weed, is a nauseous bitter. The bark of the root of the *Liriodendron tulipifera*, tulip or poplar tree, is more pungent and aromatic than bitter. *Chironia angularis*, or centaury; *Gentiana saponaria*, or blue gentian; *Veratrum luteum*, or devil's bit: the red berries of *cornus florida*, or dog wood; and the bark of several species of *Salix*, or willow—are weaker bitters than the yellow root.

I have often used the powdered stem and root of the *Xanthorhiza* with success, in the dose of two scruples to an adult, in many of those diseases in which bitters are recommended, but generally combined with other remedies. It is a medicine which sits easy upon the stomach, and produces no disagreeable effects.

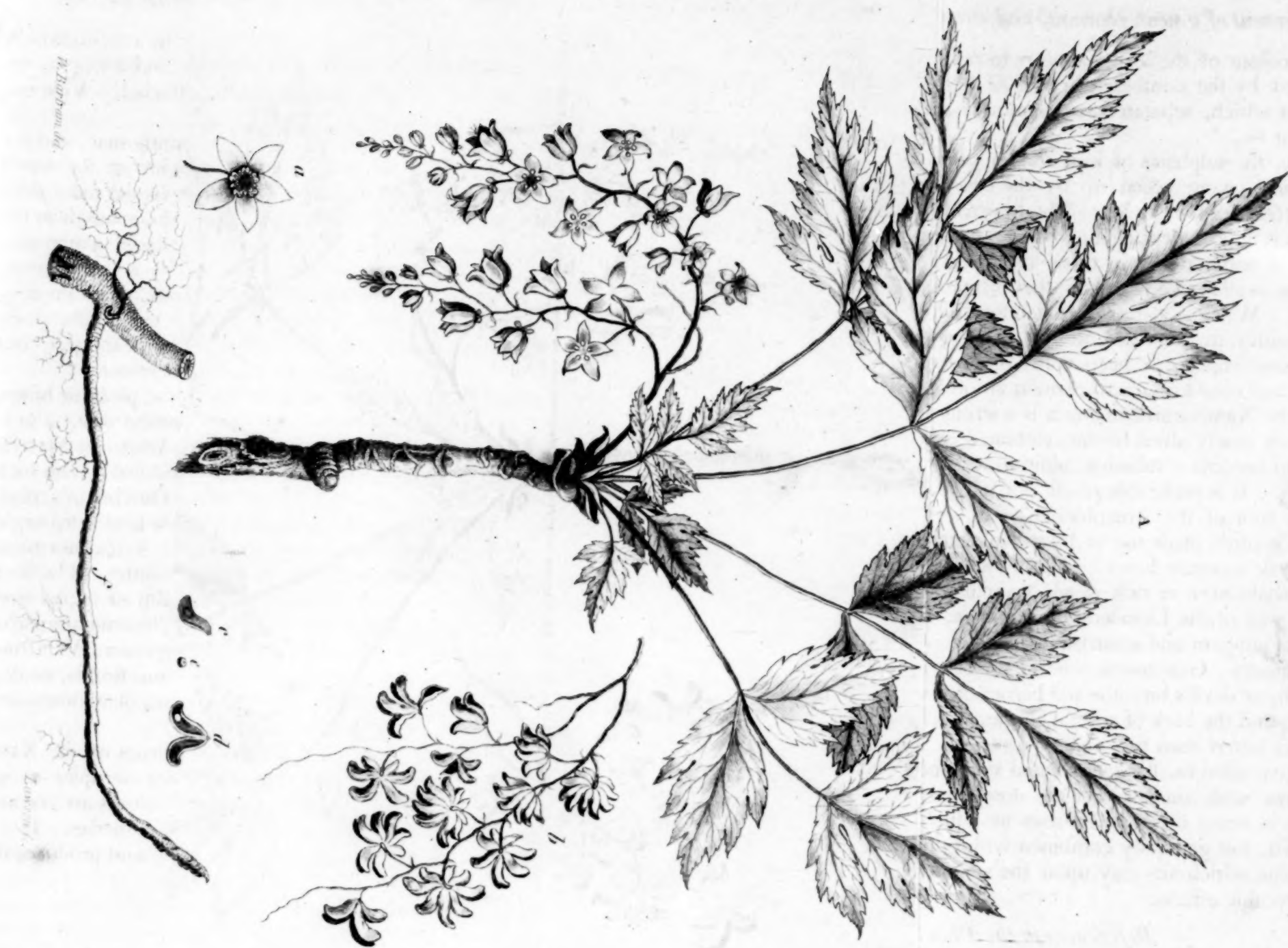
References to the Plate.

A. A branch representing the foliage, flowers and fruit of the *Xanthorhiza tinctoria*.

- a. A flower somewhat magnified.
- b. A branchy peduncle, showing the capsules.
- c. A capsule.
- d. A capsule open, showing the single seed.
- e. A seed.
- f. A portion of the root, sending off a scion,

M. Benth. del.

Anthriscus hirtellus



which he treats, and travel from one of his poles to the other.

c. A seed.

f. A portion of the root, sending off a scion,

REVIEW.

ART. I. *Considerations on the Substance of the Sun.* By Augustus B. Woodward. 8vo. pp.90. *Washington.* Way and Groff. 1801.

IN England the name of Woodward is well remembered as having belonged to a man who, among other matters, was an indefatigable searcher into the structure and constitution of fossils and minerals, and a respectable theorist of our earth, the principal part of whose bulk is made up of such bodies. In America we find the same name associated with a bolder enterprise. The Woodward of the nineteenth century, standing upon the ground explored by his predecessor, elevates his views above terrestrial objects, and attempts to philosophize upon the great centre round which the globe we inhabit, and the other planetary spheres, revolve—the sun himself.

On reading the title-page of this piece, we were at first somewhat startled at its novelty, and felt a degree of apprehension, that, on perusal, we should find a train of visionary and fanciful notions, like many others which have been indulged on the same subject. But the examination of its contents has satisfied us that our forebodings were groundless. The author not only possesses a large share of talents, but also skill in their management and direction. His learning gives him an elevated rank among the scholars of his country, and his genius places him in the society of her inventive sons. He is well endowed with the power of comprehension, and with the additional faculty of selecting and combining ideas in a clear and logical manner. He seems to have made himself master of what has been advanced on the subject by the ancients and moderns, before he began to think for himself; and has thereby been enabled the better to give a display of his own opinions, distinct from those of his predecessors. It would be honourable to our nation if such proofs of abilities were more frequent.

Indeed, it is not to be expected, that in so arduous and intricate an inquiry the author could make all difficulties vanish before him. He could not visit the resplendent luminary of which he treats, and travel from one of his poles to the other.

It was not in his power to determine, from actual examination, whether his body consists of rocky and earthy strata; after the manner of the planet we tread upon. Nor could he even soar, on Dedalean wings, so near to the sun as to distinguish what his atmosphere and his surface offer to the eye within the limits of distinct vision. But, considering the sun as the source of electricity, of light, and, indeed, of heat, to the world we inhabit, he thought it allowable and possible to reason upon certain of their phenomena here, in such a manner as to aid us in understanding the constitution of that distant orb whence they proceed. As these three agents exist abundantly in the body of our planet and its atmosphere, Mr. W. supposes that the facts known concerning them here, particularly electricity, will furnish a basis to reason upon, and to form conclusions applicable to the actual condition of the sun, whence it appears to proceed. As, in commercial dealings, a small quantity of cocoa, coffee or wheat, taken from a large parcel, serves as an example of the whole; or as, in scientific experiments, the caloric which acts upon a thermometer in New-York, though very inconsiderable in quantity, is considered as an indication of the expanding quality of that agent all the world over; or as experiments on the analysis and synthesis of water at Paris have been deemed applicable to all water in every region and climate; so the author seems to suppose, and, as far as we can judge, with much appearance of truth, that experiments made in this world, upon substances emitted by the sun, will enable us to form as just an opinion as the nature of the case allows concerning the real constitution of that luminary, at least as far as those substances are concerned.

The work is divided into seven parts: 1. An historical review of the opinions of the ancients on the substance of the sun. In this the author quotes from the old writers, and chiefly from Diogenes Laertius and Plutarch, the accounts they have left to their posterity, of the speculations on this subject by Thales, Anaximander, Anaximenes, Diogenes of Appollonia, Anaxagoras, Pythagoras, Democritus, Euripedes, Metrodorus, Plato, Lucretius, and Hipparchus. In the exhibition of these opinions, the author has agreeably intermingled with his narrative biographical sketches, which diversify and enliven: and, among other things, he ascribes to Pythagoras a right conjecture as to the constitution of our solar system, which that distinguished Greek learned from the priests of Egypt. Pythagoras, he thinks; was informed of the doc-

trine of the four elements of fire, water, air and earth; that the sun was the centre of our system; and that the earth was spherical. That eminent ancient philosopher believed the light of the moon to be but the reflected rays of the sun; that the stars were worlds, and the planets were inhabited. The comets seemed to him to be eccentric stars, and the milky way clusters of small stars. Thus had his capacious and vigorous mind anticipated, by *a priori* considerations, a great proportion of those astronomical facts which have been verified by the discoveries of the moderns.

2. Mr. W. gives a concise, but comprehensive, review of the opinions of the moderns on the particular nature of the sun. In this literary exercise, the philosophical theories and systems of Des Cartes, Newton and Herschell, are stated in a summary way, and rendered additionally interesting by occasional biographical notices. He next considers the popular notion, that the substance of the sun is fire. He traces the origin of the idea of fire, and of the placing it by the ancients as one among the *four* elements. The dissatisfaction of the chemists with this quadruple arrangement is then exhibited, with the efforts of the alchemists to rank *salt* among the elementary substances; though the author mentions nothing of similar attempts in favour of *sulphur* and *mercury*. Then follow an epitome of the phlogistic doctrine of Stahl, and the oxygenous theory of Lavoisier. He states the opinion of Darwin, that the sun is a phlogistic mass of matter; and of the unfortunate Elliot, that the solar light proceeds from a dense and universal aurora surrounding his body on all sides.

From a consideration of all these opinions of philosophical and speculative men, as well in modern as in ancient times, Mr. W. concludes, that the question of the true substance of the sun has not been satisfactorily answered by any of them, but still remains a problem for the exercise of human ingenuity and talents.

3. He proceeds, in the third place, to produce his own hypothesis. That he might state it the more clearly, he has found it necessary to invent a new term, or rather to employ an old word in a new sense. This is the word *electron*, which the Greeks employ to signify succinum, or amber, but which Mr. W. has chosen to denote that peculiar matter or substance which has been called electricity and the electric fluid. He has carefully and happily selected this word because it had a near affinity to the terms already in use, and, therefore, made no outrageous innovation in language; and because it has as

near a resemblance and etymological connection with *ηλεκτρον*, one of the Greek names for the sun. But as this part of Mr. W.'s publication is well calculated to afford our readers a specimen of his genius and expression, we shall lay it before them in his own words:

"After this review of different opinions, presented to the world by reflecting men, both of ancient and of modern times, and in every enlightened country, it is now time to advance the hypothesis which will be contended for in this work.

"The hypothesis, then, which will be advanced, and attempted to be maintained in this work, is, *that the substance of the sun is electron.*

"The term *electron* is devised for the purpose of this work, in order to designate a substance which has been for some time a subject of science, though its extraordinary phenomena still defy the utmost efforts of human genius and investigation.

"It will be proper to account for the selection of this term in this instance.

"No remark will more abundantly be verified in the history of science, than that a judicious selection of names for substances of which the reality and identity are either ascertained, or intended to be asserted, contributes greatly to advance the subsequent progress of knowledge respecting the substances themselves. An injudicious and confused use of words produces want of precision, and sometimes insuperable ambiguity, in a science, and thus greatly retards its future advances. Language is scarcely more useful as an instrument for the communication of ideas, than it is as an instrument of thought. He who is possessed of a correct and appropriate language, can not only pursue his own reflections with precision and certainty, but can, with equal precision and equal certainty, communicate the result to others.

"It is in vain that the easy and indolent mind inveighs against all innovation in language. In order to arrest innovation in language, it is first necessary to arrest innovation in knowledge; and this, if ever desirable, would be a measure highly to be regretted in the present barbarous and incomplete state of human science.

"True it is, that in a technical nomenclature, the innovations which are attempted by a visionary and fanciful projector are to be carefully distinguished from those innovations which spring from a just and feeling sense of the imperfection and

inadequacy of current terms. No one should dare to touch the nomenclature of a science, unless he attempts to advance the science itself. If his discoveries are essential and important, and such as eventually command the assent of mankind, a language justly applied to them will always claim attention; and it will be found that the consequent corrections of the prevailing nomenclature will be deemed equally sacred with the truths to which they are attached. If, on the contrary, a theory is so illy digested as to be immediately exploded, or if its effects are injudiciously appreciated, and the language of its advocate is, on these accounts, pregnant with falsehood, or inapposite and useless, he will find the latter to participate of the contempt and disgust which await the former. The virtue and good sense of mankind generally reward those who successfully persevere in enlightening them with merited applause; but such, unfortunately, is the uncharitableness of human nature, that he who, in the attempt to enlarge the boundaries of knowledge, has committed an error, is consigned to ridicule, to execration, and to infamy. These are the hard terms on which the votaries of science obtain their title to a small portion of public esteem; and to these hard terms, with all that fear and trepidation which their severity exacts, I, in common with others, submit.

“ It has appeared to me, that the term *electricity*, as at present used, is accompanied with a very material defect, which there has not been hitherto an attempt to remedy. He who wishes to assert the distinct and independent existence in nature of a substance to which electric phenomena are to be ascribed, will find no proper and unexceptionable term in the current nomenclature by which to convey that idea. Those who have hitherto loosely admitted the idea of materiality, as attached to the cause of electric phenomena, have been compelled, in order to express the subject of that materiality, to use an awkward and deceptive circumlocution, the parent, if not of error, at least of ambiguity. To the adjective appropriate to the word they annex the substantive *fluid*: thus, while asserting the materiality of the cause of electric phenomena, asserting, at the same time, a dark and ambiguous position, which, if it should, on full investigation, be found to have some slender propriety in language, yet can impart no facility to the incipient acquisition of knowledge respecting the substance itself. Hence it is that the mind has yet scarcely drawn the distinction between the cause and the effect. The attention is engrossed by the latter; and it is only

by an effort of abstraction that the mind is enabled to grasp the former, to subject it to its power, and to handle it in a series of complex investigations. Hence it is, that long as electric phenomena have been the subjects of human curiosity and astonishment, as well in the unlearned as in the learned world, not only all the popular ideas of the substance are indefinite and vague, but the minds of many men of deep research have regarded it with transient and superficial attention. Satisfied with the evidence of the reality of the effects, they have soon become discouraged in their attempts to gain an acquaintance with the nature of the cause. Hence also it is, that while the most elusive and recondite matter has been perseveringly pursued through every protean transformation, arrested and held by the mind, and assigned its proper station among the elementary or compound substances of the new chemistry, electron, *as a substance*, has been totally pre-termitted and forgotten.

"I cannot derive a stronger justification for the introduction of a new term, for the purpose of carrying on the discussion proposed in this work, than is afforded me by the history of the science last referred to.

"Every chemist, whichever of the conflicting theories he may have adopted, will be ready to acknowledge what a powerful effect the invention of the word *phlogiston*, by Stahl, of Prussia, had upon that science. It will have served for a whole century as an instrument of thought, of investigation and discussion, which has already advanced chemistry to a perfection, a dignity, and a utility, it could not before have aspired to. This effect attended the invention of the term alone, whether the theory on which it was predicated shall be found true or false.

"When Lavoisier, of France, advanced his doctrine, that the existence of phlogiston was entirely hypothetical; that it was not contained in metals; that the base of the air which it was supposed to form was to be sought in one of the component parts of *water*; that *water* was not, as had been supposed, a simple and elementary substance; and that an air, which was before supposed a compound, was derived from a simple elementary substance, the existence of which had not been previously known; to illustrate all these allegations, to introduce them to the apprehension, and subject them to the most rigid investigation of mankind, it was absolutely necessary to invent a new language, predicated on the truth of what was thus asserted.

"The same indefatigable labourer in the fertile vineyard of chemistry, when he wished to assert the *materiality of heat*, and its existence as a simple and elementary substance, did well to invent a term expressive of those ideas, and founded on the truth of those positions; and so, if ever an antagonist should arise, in direct hostility to these principles, and disposed to contend for the positive nature of *cold*, its *materiality*, and the existence either of itself, or of some other principle in combination with it, as a simple and elementary substance, it will be no less proper for him to invent a name expressive of that elementary substance, and founded on the truth of the positions he advances respecting it.

"Another important instance is afforded in our own country. Mitchill, of the United States of America, has advanced the hypothesis, that the *azote* of the French chemists, the principle of that air which Priestley, of Great-Britain, imagines to be derived from two others, without an independent origin of its own, is the basis of all pestilential fluids; that oxygen gives activity to this substance; that, when it becomes an acid, it is quelled, as all other acids, by alkalies. Hence he has deduced his ingenious proposals for permanently securing the health of cities; an object the most interesting to the United States of America of any which can at this time be agitated. Contemplating the subject in this light, he has given a *positive* name to the substance of which he speaks, and on which he builds so important a theory, in lieu of the *negative* name given to it by the French chemists. The introduction of the term *septon* will advance the science to which it is allied, and that whether the theory of its learned inventor should hereafter be established or overthrown. It will either be itself the foundation of a true theory, or become an instrument, in the hands of some succeeding investigator of science, to produce it.

"Thus, in the present instance, believing the materiality of the substance of which I speak, and its existence as a distinct and elementary substance, not generated from, or compounded of, any other matter known to us, and desirous of considering this substance in consistency with these positions, abstracted from any effects it really does, or is supposed to produce, it is necessary to find a term distinguishing the matter or substance itself from the mere effects of its presence, its motion, or any other affection of it. This the present nomenclature of the science to which it belongs does not af-

ford; and, therefore, a term is selected for that purpose, as analogous to existing terms as can be formed.

“For these reasons I shall use the term *electron*, to designate the matter itself, which is here spoken of, contemplating it as an elementary substance, not compounded of any other substances presented to our observation upon this earth; the term *electric*, as the correlative adjective—the term *electricity*, when speaking of the effects produced by the presence of electron, or when speaking of our knowledge of electron as a systematized science—the term *conducting substance*, to express those bodies through which electron passes readily, without any, or with little resistance—and the term *excitable substance*, to express those bodies by means of which an accumulation of electron is artificially procured.”

4. In the fourth division of his subject, the author offers an historical account of electric discoveries, noting what was discovered successively by Thales, Theophrastus, Gilbert, Boyle, Guericke, Newton, Hawksbee, Grey, Du Fay, Von Kleist, Cunæus, Musschenbroek, Dalibarb and Franklin, and exhibiting a compendium of the progress of that branch of science.

5. Mr. W. then enumerates some of the most remarkable phenomena in which electron, *as a substance*, is observed to be present. And the phenomena of lightning, thunder, aurora borealis, lucid meteors, earthquakes, of the gymnotus and torpedo, and of the artificial electrical machine, are separately and distinctly considered.

6. Having stated these facts, the author proceeds to the more immediate object of his undertaking, which is to adduce those powerful considerations which lead him to conclude that the substance of the sun is electron. Here the reasoning he adopts is of the analogical kind, pointing out the similarity of appearance and effect between *terrestrial* and *solar* electricity; or, in other words, between electron, as it operates in our mundane system, and electron, as it manifests itself in and about the body of the sun. The point to which the author's reasoning is directed is, that the sun is the great reservoir or magazine of electron for the worlds which surround him, or the vast electrical machine for the universe. Though the reasoning herein is analogical, our readers will remark that the analogy is of the closest and strictest kind. The analogies between electron, as collected by *artificial machinery*, and electron, as exhibited by *solar machinery*, are the following: 1. Both of them are accompanied by light and heat. 2. Both have a similitude of sensible appearances, like dense luminous

fluids, or masses of elementary fire or light, corresponding in colour. 3. Both have a tendency to assume a spherical or globose figure. 4. They resemble each other in the property of attraction. 5. They also both possess a power of repulsion, which they communicate to the earth and to the sun, and, generally, to every species and particle of matter which they pervade. 6. The curious experiments related by Grey to Mortimer, and, in part, repeated by Morgan and Adams, of the revolutions which small bodies were made to perform around large ones by artificial electricity, resembling the circular and elliptical motions of the planets around the sun, and of satellites round their primaries. 7. Besides these points of agreement between *electron as excited by art*, and *electron afforded by the sun*, there is no memorable difference between them but in degree or quantity; and as to that, the old axiom will apply—*Magnitudo non facit differentiam*.—The author's sentiments, under the fifth and sixth of these heads, are so original and curious that we extract them for the instruction of our readers. After reciting the opinions of Newton, Buffon, Bowdoin, Herschell and Darwin, as to the cause of the *centrifugal force of the planetary bodies*, he proceeds thus to offer his own reasons for believing that it is owing to a repelling power in the mass of electron of which the sun is composed.

“These different opinions are so hypothetical, so removed beyond the test of analogy and experiment, as to be equally unsatisfactory. It would afford a relief to the mind, to be able to discover a single circumstance which would authorise the presumption, that the sun possesses a *repulsive* as well as an *attractive* power, and that the planets which revolve around it are the objects of the one, as well as of the other of these powers.

“Both the repulsive and attractive powers of electron are at present mysterious. We cannot comprehend what are still termed the plus and minus states; or why *dissimilar* states, as in magnetism, produce attraction, and *similar*, repulsion. We cannot, indeed, assert that electron itself is either homogeneous or heterogeneous in its nature. Without, however, any solution of these questions, we may readily conceive that a mass of matter may be heterogeneously composed in respect to these two powers; so that, if its homogeneous parts were separated, a mass of electron would exert upon the one an *attractive*, while upon the other it exerted a *repulsive* power. Without extending the inquiry to the heterogeneities of the

matter of the sun, we actually find that our earth is of heterogeneous composition with respect to electron; or, in other words, that it is *a sphere of conducting matter, charged with electron*.

“ Having the strongest reason, from its strict analogy with electric phenomena, to believe that the attractive power which the earth exerts upon matter at its surface, inheres in it by virtue of its being *a sphere of conducting matter charged with electron*, we readily comprehend why, if it was capable of exerting a *repulsive* power also, the effects of that power should escape our observation. If ever there was on it, or near it, any matter on which, as a whole, it exerted a *repulsive* power, as strong as it still exerts upon other matter an *attractive*, such matter must long since have been detached and removed from it. We find, however, that when a small portion of that electron with which it is charged is artificially detached from the whole mass, it possesses the *attractive* power in a stronger degree than *the whole charged conductor*; and, in this situation, the natural and permanent arrangement being somewhat disturbed, the evidences of a *repulsive* power begin also to be manifested.

“ We have an additional reason for believing that the earth is not destitute of a repulsive power. Three instances of specific attraction are presented to our observation upon this earth—chemic attraction, magnetic attraction, and electric attraction. In the two latter we uniformly find the correspondent quality of repulsion. The nature of the first is so mysterious, and our acquaintance with it is at present so slender, that it would be premature to assert either that there does, or does not, exist a correspondent quality of repulsion. In the attraction which subsists between the sun and the planets, whether it should be deemed a specific attraction of its own kind, or one of those already known, it would be rational, from analogy, to infer, that a contemporaneous power of repulsion exists, which would not fail to be observed, if the objects upon which it was exerted were present.

“ Indeed, it appears extraordinary, that while a general *attractive* power has been attributed to matter universally, a correspondent *repulsive* power has not been also attributed. If it is to the attraction of the parts of a body to one another, that its *cohesion* is ascribed, to what quality but *repulsion* ought to be ascribed its *impenetrability* and *resistance to the touch*?

"In one instance we have an indubitable proof that a repulsive power begins to be exerted at a considerable distance from the repelling body; and is exerted with the greater strength, in proportion as the distance becomes less. This is in the reflection of light by a glass mirror. Newton, of Great-Britain, has shown, that a ray of light, impinging on a glass mirror, begins to be repelled at a considerable distance from the surface of the mirror, and is actually retroverted without ever having come into contact with it. Priestley, now of the United States of America, formerly of Great-Britain, in pursuance of these observations, has gone so far, in his disquisitions on matter and spirit, as to deny that, in any case of resistance by matter upon matter, there is an actual contact; but that it is only a *repulsion*, infinitely increasing in proportion to the approximation; and that, when that repulsion has once been overcome, all further resistance ceases.

"Certain it is, that, with respect to all our senses, effects are produced which appear to have little resemblance to their causes. The sense of hearing is but the effect of the impingement of matter, in a fluid state, upon the extremities of the *auditorial nerves*; and the sense of seeing is but the effect of the impingement of matter of very great *tenuity*, and very great *velocity*, upon the extremities of the *optic nerves*. So the sense of *feeling* is probably only the effect of a *repulsive power in other matter, exerted upon the matter of the human body*. Whenever, therefore, a species of matter really exists, which possesses little or no repulsion of that kind, such as *light*, or *caloric*, or *electron*, we may, by the exercise of reason, obtain the demonstration of its materiality; but we cannot have the direct evidence of the sense of feeling.

"To return to the repulsive power of the sun, as a *mass of electron*, upon the planets, as *charged conductors*, let us, as in the former instances, imagine that state of absolute and perfect insulation, which it is so difficult, if not impossible, to obtain upon the surface of this earth. To a spherical mass of electron, in this situation, let us present a sphere of conducting matter charged with electron, bearing to each other the proportion of a planet to the sun. Whether we consider an axial revolution as inherent in an insulated sphere of electron, or whether we conceive such a motion to be imparted to it from any extraneous material or mental agency, the effect of producing both an axial and orbital motion, in a sphere of matter heterogeneously composed with respect

to its *attractive* and *repulsive* powers, would appear, *a priori*, to be the inevitable result. Whether this result has ever actually been obtained in our experiments upon this earth, is a question which belongs to the succeeding consideration.

“The sixth consideration in favour of the sun’s being a sphere of electron, is, then, the partial proof which we have derived from an experiment tending to substantiate that fact.

“This experiment, like that relative to the sphericity of an insulated mass of electron, and its tendency to an axial revolution, is curious in its kind; the result of accidental combinations, which our reason has not yet attained sufficient vigour spontaneously to repeat.

“The authenticity of the experiment cannot be doubted, because it is attested by men of veracity, one of whom repeated his account of it to the other on his death-bed; and that other once succeeded in the repetition of it, though, unfortunately, at a time when no witness but himself was present.

“The experiment establishes, in a manner almost conclusive, the general theory maintained in this work; and presents us with an orrery of no mechanical kind, but apparently *animated with that vital energy* which the system it was made to imitate possesses. It was performed by Grey, of Great-Britain, of whom mention has been already made. The following account of it is in his own words:

“I have lately made several new experiments upon the projectile and pendulous motions of small bodies by electricity; *by which small bodies may be made to move about large ones, either in circles or ellipses; and those either concentric or eccentric to the centre of the large body about which they move, so as to make many revolutions about them.* And this motion will constantly be the same way that the planets move about the sun, that is, from the right hand to the left, or from west to east. But these little planets move much faster in their apogee than in the perigee parts of their orbits; which is directly contrary to the motion of the planets about the sun.”

“This account excited much speculation and curiosity. Skeptical minds could not admit the possibility of so strange an effect. The general impression was, that the experimentalist was sincere in his assertions, but that his senses had been deceived.

“On his death-bed he related to Mortimer, his countryman, the manner in which they had been made. The following is the statement he gave:

‘Place a small iron globe, of an inch, or an inch and a half in diameter, on the middle of a circular cake of rosin, seven or eight inches in diameter, *greatly excited*; and then a light body, suspended by a very fine thread, five or six inches long, held in the hand, over the centre of the cake, will, *of itself, begin to move in a circle round the iron globe,* and constantly from west to east. If the globe is placed at any distance from the centre of the circular cake, it will describe an ellipse, which will have the same eccentricity as the distance of the globe from the centre of the cake. If the cake of rosin be of an elliptical form, and the iron globe be placed in the centre of it, the light body will describe an elliptical orbit of the same eccentricity with the form of the cake. If the light body be placed in or near one of the foci of the elliptical cake, the light body will move much faster in the apogee than in the perigee of its orbit. If the iron globe is fixed on a pedestal, an inch from the table, and a glass hoop, or portion of a hollow glass cylinder, excited, be placed round it, the light body will move as in the circumstances mentioned above, and with the same varieties.’

“He added, further, ‘*that the light body would make the same revolutions, only smaller, round the iron globe, placed on the bare table, without any electrical body to support it;*’ but he stated, ‘that he had not found the experiment to succeed if the thread was supported by any thing but a human hand, though he imagined any other animal substance would have answered the purpose.’

“After the death of Grey, Mortimer made many unsuccessful attempts to put into practice the preceding directions. In one instance alone he succeeded; but no person but himself being present, the same skepticism induced men of literature to believe that, like Grey, his senses had been deceived. The repetition of the experiment was attempted by others, but without success. Some supposed that the successful instances had taken place by candle-light; and that the cause of failure had been the attempting them by day-light. There is no doubt that the combustion of a candle, or of a fire, in the vicinity of the experiment, would have a material effect upon it one way or the other; but the probability is, that the effect would have been the reverse of that which has been supposed. If it were not contrary to the determination I have adopted in this discussion, not to interfere with the theories

of light and heat, I would attempt to show that caloric is really material, *and that it is a conducting substance*; that the extrication of it, therefore, by the process of combustion, in the vicinity of an electric experiment, must have a sensible influence; and that it is owing to an extrication of it insensibly produced by the friction of the apparatus, that electron is always so equally diffused through the Boylean vacuum, and becomes dispossessed of its attractive and repulsive powers.

“It is worthy of remark, that one part of the experiment of Grey has been often repeated, and may at any time be repeated: that is, the execution of the experiment by means of a glass hoop, or portion of a hollow glass cylinder, excited. Morgan, and Adams, both of Great-Britain, have repeatedly performed this part of the experiment; though the latter states that there is much nicety required in it, and that many attempts will be necessary before that nicety is attained.

“If an experiment so nearly approaching to a demonstration of this theory has been actually performed, even in this imperfect way, what might we not expect if a state of *perfect insulation* could be obtained, and a *solid sphere of electron* made the instrument of our experiments? A reflecting mind can scarcely entertain a doubt that it would be attended with perfect success, and that a complete demonstration of the hypothesis here contended for would be the result.”

The seventh and last division of the work before us contains Mr. W.'s suggestions as to the means necessary for subjecting his hypothesis to the test of direct experiment. To this we refer as indicating a provident and circumspect mind.

We cannot conclude our account of this piece of philosophical research, without expressing our approbation of the candour and liberality which characterize it. Although the author is adventurous and daring in his undertaking, yet he conducts himself every where with a becoming diffidence and modesty. Differing as he does from those who have gone before him, it is remarkable with what fairness he states the opinions of others, and with what manliness and respect he mentions their authors. We observe no traces of a censorious or dogmatical spirit. What he advances he knows and acknowledges to be but an hypothesis; but he is of opinion, and in this we concur with him, that it looks more like an approximation to truth than any with which we are acquainted

on the same subject. We hope, therefore, the philosophical corps will march forward where this pioneer has led the way. We regret that he has omitted the consideration of the scientific history of heat and light; but his reasons (see sect. 183) for waving the minute consideration of them, will probably satisfy most of his readers.

ART. II. *A Letter to Dr. Percival (of Manchester, in England), on the Prevention of Infectious Fevers: and an Address to the College of Physicians at Philadelphia, on the Prevention of the American* Pestilence.* By John Haygarth, M. D. F. R. S. &c. 8vo. pp. 188. Bath. Crutwell, for Cadell & Davies, London. 1801.

ALREADY have the Americans received advice from France concerning the method of preventing and curing the endemic distemper of their cities during the hot season (Med. Rep. vol. iii. p. 204). Since the receipt of that communication, something of the same kind has been forwarded to the United States from Ireland. (Med. Rep. vol. iv. p. 83). And now a book of counsel and knowledge, intended for their use and edification, is sent over from England. They ought to feel grateful for the favours thus intended them. The sympathy of the wise and the learned in foreign countries, cannot but affect them in an agreeable manner. In cases of difficulty and distress, what can be more welcome than the disinterested suggestions of friendship?

There is nothing which the generality of mankind part with more freely than advice. Almost every person thinks himself capable of imparting something of importance to his weak or ignorant neighbours. Commonly, however, this proffered admonition, being but of little value, is lowly estimated: for vanity, which prompts the adviser to urge his counsel, is frequently more conspicuous than ability. Yet, for the most part, these public and private monitors are not to be denied the merit of good intentions. The mere sentiment of benevolence, however, though laudable in him who feels it, is of no substantial advantage to the person who suffers for want of help. Abstract philanthropy, to be efficacious, ought to be followed by directions derived from a profound and practi-

* It may now be called the *Spanish* pestilence too. See p. 105 of our present volume.

cal knowledge of the subject. And he who has been most conversant in the scenes, transactions or business upon which he ventures to give information to his fellow-citizens, will be most capable, other circumstances being equal, to do it correctly and effectually. But although a kind heart and an intelligent head should unite in the person who undertakes to influence the opinions and conduct of an individual, or of a great body of men, something more than these is highly requisite. The *manner* of doing a thing is not unfrequently almost as important as the matter itself. Often has it happened, in human affairs, that counsel which has been well-meant, and even ably devised, has failed in its effect, because it was accompanied with something odious, disgusting or insulting, in the mode of communicating it. The precepts and example of Cato would have had more sway in ancient Rome, had the censor been as remarkable for good breeding and politeness as for honesty. And the arguments and eloquence of Demosthenes would doubtless have been exerted with more effect, had not the orator affronted the Athenians by frequent reproaches and abuse. It is not enough to convince men they are wrong, and coldly tell them what is right: to work reformation there must be a prudence, a suavity, an earnest concern, and a persuasive kindness; there must be the style of the optative mood, to temper the bluntness of the indicative, and the harshness of the imperative.

These reflections are suggested as well by the manner as the matter of the didactic pieces which have been received from Europe on the subject of pestilential diseases. Writing to the benighted regions of the west, from the countries where light and science had an earlier dawn, the *wise men of the east* address the transatlantic people as gropers in darkness and error. They seem to forget that, in the revolutionary course of things, the light of science, as well as of day, may, perhaps, shine brightly upon these tracts of earth, after it shall have been withdrawn from theirs.

Although the American States can no longer be viewed as colonies or provinces dependent upon the *politics or government* of sovereign Europe, still the schools of that quarter of the globe claim America as a district of their literary empire, and usurp *scientific* dominion over the minds of her inhabitants. They pretend that they must see for them, and hear for them, and feel for them, and not they for themselves. They affect to gather facts for them, to make experiments for them, to reason for them, and to judge for them, lest, through

their extreme imbecility, they should go astray. They insist that they have a right to legislate for them, to bind them in all cases whatsoever, and to treat them as rebels if they disobey. But it is time for Americans to abjure publicly all such supremacy, and to assert their own dignity and privilege; to declare, that on the ground of free, fair, and equal discussion, they will meet them as philosophical friends; but to proclaim, that they will exercise their senses, their understandings and their judgments, free from all authority, dogmatism, or any other controul, save that of truth alone.

We are at a loss to discover what it is that makes such a mighty difference between an European and an American mind; why the former should claim the authority to command, and the latter be required implicitly to submit. Is it that the institutions of Europe are better? Hundreds of our youth have been educated there, and have profited by the good things which they inculcate. Are the instructors more wise and learned? These Americans have crossed the Atlantic to grow wise and learned by hearing and imitating them. Are the opportunities preferable? These too have been enjoyed. In medicine, particularly, the wards and cases of the sick of Guy's, St. Thomas's and St. Bartholomew's Hospitals, are as well known to many Americans as to native Britons. The opinions and doctrines of the College, and practice of the Infirmary at Edinburgh, are as well understood by natives of Virginia and Carolina as by those of Perth and Inverness. Physicians who have listened to the lectures of CULLEN, and even to the prescriptions of AKENSIDE, are frequently to be met with in America.

Or, is there some hebetude of intellect, some unhappy defect of capacity, which distinguishes and degrades the man of the west? We shall not affirm positively that this is not the case, though certainly we have no evidence to convince us that it is. On that point we shall be content to let their comparative merits be judged of by others.

In one respect, American physicians, who have been educated in Europe, have unquestionably the advantage over Europeans who have never visited America: and this is in the knowledge of their own climate—the peculiar vicissitudes of the seasons—the manners, occupations, and way of life among the inhabitants—their local condition and circumstances—their constitutions—the exciting causes of their diseases, and the mode of treatment which experience has pronounced best. Such a man unites to all the information he can gain in the

schools of Europe, all this additional knowledge, which his voyage from one part of the world to another enabled him to acquire; but which the European, who never travels nor examines for himself in foreign countries, never can acquire.

It might, indeed, be affirmed, that native American physicians, who have pursued their professional studies at home, are, to say the least of them, on the same footing with those Europeans. Such have attended courses of public instruction in universities and hospitals. They have had the advantages of public libraries, and of the conversation of the learned. And, during their attendance upon the instruction derived from others, they have been enabled to see for themselves, the domestic production, destructive operation, and gradual extinction of pestilential fluids. Professional men of this class have a better right to judge, preferable means of judging, and higher claims to credit, on the endemic and epidemic distempers of their own city and country, than a speculative member of the faculty, who dwells beyond an ocean three thousand miles wide.

American physicians, in common with their fellow-citizens, have their feelings excited for the calamities which some of their towns have experienced by sickness. These visitations bring to their recollection the more frequently repeated and more severe ones endured by London, Rome, Paris, and even Newcastle upon Tyne. Their interest impels them to explore and develop the causes of these unhappy events: and no motive can be found more powerful than this. The property in houses and lands, which many of them possess, in streets and places which have undergone the ravages of disease, may be supposed to render them vigilant as to every inlet or lurking place of pestilential poison. An occurrence in which the lowering of rents, and the consequent lessening of income, are concerned, may be expected to stimulate the mind to the nicest examination of facts. A poison which, in the city of New-York, has destroyed, within three months, the lives of more than twenty practitioners of medicine, well deserves to be traced and understood by the survivors. And yet, with all these opportunities to acquire knowledge on the subject, and with all these incentives to vigilance and care, the American physicians and philosophers, who have viewed the rise and progress of pestilence—walked amidst it by day and by night, year after year—beheld their friends and fellow-citizens falling around them as on the field of battle—endured its violence in their own persons almost to the extinction of their lives—and

suffered from it largely in the depreciation of their property—these men, we say, are considered as incompetent witnesses before the judges of the medical tribunals of Europe.

One of the most rigid and intolerant of these is Dr. Haygarth, the writer of the volume now under consideration. This author had acquired, some years ago, a good share of reputation, by two publications, entitled, “An Inquiry how to prevent the Small-Pox,” and “A Sketch of a Plan to exterminate the Casual Small-Pox in Great-Britain.” And his fame might have been perpetuated with the spread and adoption of his schemes, had they not been superceded, and rendered abortive, by the splendid discoveries of JENNER. The substitution of the vaccine instead of the variolous poison, being more practicable, sure and easy, than the plans of Dr. Haygarth, has already rendered the books which he has published uninteresting and useless, or nearly so.

The prevention and extermination of the small-pox was thus provided for, not only in the British Islands, but all over the earth, by a plain and simple operation, utterly subversive of the labours of this gentleman. The nice calculations and estimates, the ingenious theories and disquisitions, the noble projects and designs, which had long engaged his attention, were ruined at a stroke. The books which contained them ceasing to be demanded or perused, were forced to retreat to the lumber-rooms of learning. And, in reality, the humane and public-spirited author was in danger of outliving the works which he had flattered himself were to be the brazen monuments of his fame.

In this deplorable state of things, what remained for a disappointed and disconsolate author to do? It would be vanity and folly for him to contradict the reality of that discovery which prostrated his schemes and his hopes. But there was another course for him to take, which promised, at first, to be nearly as successful as the one in which he had been foiled. This was to apply the same rules which he had laid down for circumscribing and extinguishing the contagion of small-pox, to the prevention of nervous and yellow fevers. But to make the directions correspond exactly, it was necessary to declare these two latter diseases were contagious like the former. And this being roundly done, British typhus and American pestilence were both comprehended within the small-pox regulations. In publishing a book upon this plan the author has the satisfaction of quoting his obsolete volumes, which every body else has ceased to quote—of referring to his labours and

improvements on the small pox—and of making an application thereof to whatever diseases he shall please to denominate contagious. The present volume answers the double purpose of being a sort of index to the former books, and of letting the public know, that notwithstanding the disappointment concerning small-pox, Dr. Haygarth has something to offer on two other diseases which *he* says are contagious; applying the delicate epithets, “frivolous, inadequate and groundless,” to the reasons of those who are of a different opinion. (p. 147).

The work is divided, as expressed in the title-page, into two parts. In the former Dr. H. treats of the “infectious fever,” called *typhus*, which infests the habitations of nasty people in the towns and villages of England. In the latter he discourses of the *pestilence*, called “yellow fever,” which is engendered in nasty ships, and other nasty habitations of men on shore, in the cities of North-America.

In the former of these pieces the author exhibits some valuable facts and deductions which are highly worthy to be made known. And we announce them with the greater pleasure, as it is our wish to let no part of the *valuable* matter which it contains be lost. Being the result of his long and meritorious labours to better the condition of the poor, they are entitled to much credit. They contain the substance of his *preliminary principles*.

Dr. H. has given a table, exhibiting the progress of infectious fevers in families (p. 20). To this are added a few pages of proofs and illustrations. Though the memorandums are imperfect and scanty, they prove that the exciting cause of disease was engendered amidst nastiness and corruption. The greater part of the cases between the 37th and 68th, appear, on the face of the narrative, to have originated from such sources. To the same origin must be ascribed the typhus fevers which affected the thirteen families at Middlewich, under the care of Mr. Taylor; the greater part of which are described as living in close, small and dirty dwellings, and oppressed with poverty, filthiness and neglect (p. 29). If members of families, or visitors and attendants, are exposed for a sufficient length of time within these manufactories of infectious vapours, twenty-two out of twenty-three, or even more, will be poisoned by them (p. 31). When the venomous gas is much diluted in a clear, large and airy chamber, its virulence is so much abated thereby as to render it incapable of exciting typhus (p. 38). And even in its concentrated state it does not readily infect physicians, and other transient visitors

who stay but a short time in a room (p. 40); though they sometimes are poisoned by it. The inhabitants of nasty and pestilential jails can gradually grow accustomed to their envenomed atmosphere, and become seasoned to it, through an acquired inaptitude in their constitutions to be rendered sickly by it (p. 44). This infectious gas is more noxious in a foul than a pure air.

Dr. H. thinks the poison of small-pox is contagious at a greater distance than that offspring of nastiness which causes typhus (p. 48). The clothes of visitors do not imbibe infection enough to be dangerous (p. 54). But the variolous virus is more quick in its operation than the typhous; the latter not producing, in certain cases, actual disease until the 68th day after its application to the body (p. 67). The mortality occasioned by this home-bred poison in the large towns of Great-Britain is enormous. The diseases produced by it "appear to be the chief cause why there is a much greater proportional mortality in large than in small towns, and houses dispersed in country situations. Lanes, entries and courts, communicate the infection to each other. *Whole families sink down together, oppressed with putrid fevers, in penury and wretchedness, without a single hand to afford them help or comfort.*" (p. 117). Dr. H. supposes, and, we think, with great probability, that the *pestis* of Livy, so frequently fatal to the inhabitants of Rome during the growth of that city, and the *plague* of the English writers, so destructive of life in London, in its progress to its present unwieldly size, were no other than distempers from a similar exciting cause (p. 121). Nastiness, excrements and corruption, were the steady accompaniments and forerunners of their typhus, in ancient no less than in modern times. And cleanliness, ventilation, and separation of the sick, will attenuate and destroy the poison, and, by degrees, dispel every apprehension of danger (p. 165).

It would scarcely be thought possible, that a man who had seen so much, and observed so well, could not distinguish between such an exciting cause of disease as has been described, and a specific contagion. Yet this is evidently the case with our author. Though he entertains doubts whether typhous fevers are *always* produced by a specific contagion? and whether they are not *also* engendered in close, dirty, crowded rooms, by peculiarities of season and the like? still he has found nothing convincing enough to win his assent to the latter query.

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natural enough to persons of but an ordinary share of discriminating power. To such the words *contagion* and *infection* appear to be perfectly synonymous. By such, *dirt* and *nastiness* are employed as convertible terms: and to such there is no distinguishable difference between a poison *produced by morbid animal secretion*, as that of small-pox, and one engendered by mere *chemical action in certain forms of inanimate matter*, as that of typhus. But by a mind accustomed to note the diversified phenomena of nature, that *vitiating product of living vascular action*, which can excite in a well person a disease like that by which itself was produced, and continue indefinitely to do so after being transferred from one body to another, will be denominated *CONTAGION*; and lues, vaccinia, measles, and small-pox, will be considered as examples of it. On the other hand, that *venomous offspring of putrefaction* going on in some of the kinds of organic matter *after death or separation from the living frame*, which disorders the healthy functions without being specifically communicable, and without the power of communicating itself, will be called *INFECTION*; and typhus, dysentery, plague, and yellow fever, will be given as instances. By a mind of this correct constitution, "dirty" will be understood to mean the collection of such *mineral substances* as constitute the upper strata of the earth, clay, sand, dust, &c. in the human body, in its clothing or habitation. "Nasty," on the contrary, will be employed to express that condition of body, dress, bedding, house and furniture, *induced by those animal excretions and excrements*, which constantly exude from the pores and ducts; and taint and envenom the substances to which they attach themselves. A mason's frock is a *dirty* thing; a beggar's blanket a *nasty* one. A house may be *dirty*, that is, it may have sand strewed about the floor, dust resting upon the furniture, ashes sprinkled over the hearth, and pieces of broken plaster scattered along the stairs; and yet this house may not be unhealthy: but where a habitation is *nasty*, and the beds and bedding are saturated with urinous and perspiratory discharges, the floors besmeared with fæces, and bronchial phlegm, and every thing porous and bibulous charged with something convertible to stench and venom, the inhabitants must possess hardy constitutions indeed if they can withstand this combination, this confederation of mischievous powers.

It is from *nastiness* degenerating to *infection* by chemical changes among its particles, that the bodies, clothes, beds and

apartments of the poor in Great-Britain, derive their poisonous, their pestilential charge. In the books of physic, and in the lectures of its professors, it has been fashionable to call this virus *human contagion*, and its exhalations *human miasmata*. As well might the contents of a jakes be called "contagion," or the reekings of a dunghill "*miasmata*." It is a poison formed by intestine workings among the elementary ingredients of excreted and inanimate matter, and as distinct from the vascular energy by which contagion is elaborated, as death is from life. There is not an atom of contagion in the case; for contagion, like other secreted fluids, is not imitable by any *artificial* process, and cannot any more than bile or semen be prepared in a laboratory by synthesis. By a common putrefactive process this SEPTIC VENOM is formed, and derives none of its qualities from pulsating arteries or glands. Away, then, with this preposterous phrase from the poison engendered by *septic processes*, and let "*human contagion*," for the future, mean nothing but small-pox, vaccinia, and the kindred forms of *morbid secretions*.—It is high time that the products of putrefaction should be distinguished from those of secretion.

But what shall become of the charming names, "*miasm*," "*miasma*," and "*miasmata*," which are of such usefulness and power, that in the present fashion of thinking, both speech and writing would be deficient and inexpressive without them? In these revolutionary overturnings must they too be deprived of the empire they have held in the schools ever since the days of Galen, and be reduced to the common level of plebeian words? It would conduce eminently to the interest of medicine that they should. But are there not, it may be asked, atoms which fly off from natural bodies under the heat and pressure of the atmosphere? Do not human excretions emit such atoms? and why may not these be called *human miasmata*? Because the phrase is indistinct, and conveys no precise idea to the mind. By the same rule, the excretions of horses and cows ought to emit *brutal miasmata*; roses and pinks ought to discharge *floral miasmata*; turpentine and tar ought to afford

* The classical knowledge of Dr. H. will inform him that *miasma* is derived from *μιαίνω*, to pollute or befoul; and, by the exquisite refinement and copiousness of the Greek language, *μιασμα* signifies both *nastiness* and *criminality*—uncleanness of body and defilement of soul. Therefore it may be inferred, that in ancient times, when the word begun to be employed medically, and the constitution of the gases was unknown, it could only apply in its literal sense to the grosser and more palpable forms of matter.

piny miasmata, &c. There is nothing correct and scientific in these ways of expression. It is true, indeed, that particles of pulverized earth may be raised into the atmosphere by wind; particles of carbon, &c. may be carried aloft, and collect into soot on the sides of a chimney; and particles of powdered wheat may float through a manufactory of flour. These are proper illustrations of this term; for they are *miasmata of dirt, of charcoal, and of meal*, which, having never undergone chemical solution in caloric or in air, but being merely mechanically attenuated and subdivided, retain their opacity, and reflect light, unaltered in their constitution and nature.

"Miasms" (so Dr. H. anglicizes the word) thus mean particles of matter, *like motes in the sun-beams*, which have undergone a *mechanical*, but not a *chemical* change: and the idea corresponded to the ruder state of philosophy, when the term was brought into use. But since that remote era the constitution of *permanently elastic fluids* has been explored; the volatilization and solution of bodies by heat has been investigated; and the weight and measure of *aërial* compounds detected, though their perfect transparency eludes all examination by the eye. These invisible compounds, of which the ancients had no proper conception, are the result of *chemical agency*, and they indicate or accompany an intestine alteration among the constituent ingredients of the substance. When water undergoes such a change by solution in caloric, it is denominated *elastic steam*, or *watery gas*; if air is the menstruum, it is called *exhalation*, *vapour*, or *evaporation*; when the transparency of the solution is disturbed, *visible* or *inelastic vapour*, as cloud, fog or mist, is the result. In Dr. H.'s language, both the solutions of water in caloric and air should be called *aqueous miasms*, as the vapours from human nastiness are termed "*infectious miasms*." (p. 56).

This attachment of Dr. H. to the corpuscularian hypothesis has led him into another fundamental error concerning these kinds of poisonous fluids. He contends that the "*infectious miasms are invisible*," that they constitute a "*poisonous vapour*," and that this "*poisonous vapour is united with air by solution*." (p. 56). Here is a curious process indeed, *of an invisible vapour undergoing solution in air!* (p. 158).

Had the learned author opened one of the modern elementary books of chemistry, he would have found that any thing whatsoever, which is volatilized by heat, becomes itself, by the union, an air or gas. His "*invisible infectious miasms*"

are themselves already in an ærial state. His "poisonous vapour" is in reality neither more nor less than pestilential air, or infection rendered volatile by heat. And his "union of poisonous vapour with air by solution" is as unnecessary as it is unphilosophical. The blunder in science which Dr. H. has committed is this: he affirms *that infectious poison is chemically dissolved in air*; WHEREAS, IN FACT, IT IS ONLY DISSOLVED IN CALORIC. It is not indebted to the atmospheric gases for its volatility and fluidity, but is itself a gas, totally distinct from mere oxygen and naked azote, even as they are gases by virtue of the caloric which gives them their permanent elasticity. Formed from *septic* materials, by a *septic* process, it is a *septic* gas, or pestilential air, which may diffuse or spread itself through the atmosphere, after the manner of hydrogenous gas, or carbonic acid gas, or any other species of air, and is pellucid and invisible for the same reason.

If, as Dr. H. contends, *infectious vapour was dissolved in air*, there would result from the combination a consequence which he seems not to foresee. Every chemical combination is attended with a change of qualities in the bodies combined, and the formation of a third product, endowed with new qualities. Infection, by chemical combination with atmospheric air, ought to turn to a *tertium quid*, to be neutralized and disarmed of its venomous qualities.

"United with air by solution." With what sort of air? If he means the atmosphere, is it with the dephlogisticated or phlogisticated portions? or both? But we must pass on to what our author remarks on *fomites*; though, as we have discussed some of his opinions already at great length, we refer our readers, for more minute and circumstantial information on them than Dr. H.'s book contains, and on some other points of the present inquiry, to Med. Rep. vol. iii. p. 168, and to Duncan's Annals, vol. iv. p. 359. Though we cannot avoid remarking, cursorily, another incorrect opinion of our author. He talks of the "increase of malignity in the *febrile poison* when it has long lodged *and putrefied* in dirty clothes and confined air." (p. 46.) Here *febrile poison* is declared to grow more malignant *by putrefaction*! If contagion *pre-exists*, and undergoes putrefaction, that process must disorganize and decompose it, as it does all other things. The poison would be destroyed by such a process. But the way in which putrefaction engenders poisonous fluids is by forming new and mischievous associations from substances that were

innocent before. The harmless carcase of a lion may, by putrefactive decomposition, turn to pestilential air; but in so doing it will change its original organization. In like manner, if the *poison of fever*, or any other sort of venom, is subjected to the putrefactive process, it will turn to something else to be sure, but during the conversion will lose its primitive constitution. We hope to hear no more of the mischief produced by the *putrefaction of contagion*!

And this is the man who abuses and vilifies the American physicians, philosophers and statesmen (p. 152 and preced.) for "not opening their eyes to the pernicious delusion, which has so marvellously and dangerously prevailed, concerning the origin of their pestilence." Because, forsooth, they will not declare, with him, that *dirt breeds contagion*, that *contagion is increased by putrefying, then turns to an invisible vapour, and dissolves in air*. When they assent to these notions, they will fully deserve all the reproaches he has bestowed upon them.

Having thus stated the difference between contagion and infection, between dirt and nastiness, between miasms and gases, and shown that, by confounding them, Dr. H. has overturned the landmarks by which he ought to have directed his course, we pass on to the *practical conclusions* which he has derived from his experience in febrile diseases. And here it becomes us to express our persuasion, that this part of his work is as judicious and excellent, as the physiological and philosophical part of it is erroneous and obscure.

His directions may be summed up in three words—SEPARATION, CLEANLINESS, and VENTILATION. (See p. 73, 96, 100, 104, 106, 110, 111, 112, 113, 114, 116, 117, 120, 134, 136, 165). For if the sick, who are always nasty, and generally exhale disagreeable as well as unhealthy gases, are thinned, and kept apart; if nastiness of all kinds is removed from the body, clothing, bedding, utensils and furniture of the sick; and if fresh air is freely admitted into his apartment, then all will have been done that is necessary, or possible, to destroy the septic venom. For an illustration of this doctrine, in regard to the *plague* of Asia and Africa, see the paper in our appendix, which we hope will rectify some mistakes upon this head under which Dr. H. seems to labour, (p. 122).

No reader that is acquainted with the history of the *nitrous fumigation*, can avoid remarking the polite and delicate manner in which Dr. H. tells the celebrated discoverer of that

fallacious mode of destroying contagion, that he has made no trial of his process, and that, from long observation, he is satisfied contagion can be readily and completely destroyed without it solely by purification and fresh air (p. 97). Smyth's nitrous fumigation never obtained any credit in America. When HAYGARTH so ably seconds the motion of TROTTER, it is not likely that it will much longer have any adherents in Great-Britain.

As cleanliness is enjoined upon all mankind by moral obligation as well as medical precept, we shall enforce Dr. H.'s injunctions to this point by offering a detail of the several processes for accomplishing that valuable and important object. From this it will appear, on analysing the subject, that the four great agents in removing nastiness and infection are, CLEAN AIR, CLEAN WATER, ALKALINE SALTS, and CALCAREOUS EARTH. *Cleanliness* and *ventilation* are in every body's mouth, yet very few, on account of the complexity of the ideas the words convey, have any precise and definite conception of what they mean.

Cleanliness is the removal of excreted fluids, and the new compounds formed of them, from the persons, clothing and habitations of men. If a man, and a marble statue as large as a man, be kept in the same chamber, the man will become unclean much more rapidly than the statue. The latter may receive dust, smoke, or foreign particles of other kinds *from without*, but will not become nasty from any internal cause. Not so with the former; his living body, which has been long ago, and very justly, compared to a smoking dunghill, incessantly emits, during life, exhalations foul enough to soil linen, and rank enough to be smelled by dogs. The accumulation of these in the pores of the cuticle, and every where about the cuticle, makes it nasty and uncomfortable, and very often renders it the seat of disease, as of the itch, blotches, sores and pimples. If this nastiness is not washed or wiped off, so as to be removed entirely from the body, it will be wiped off by the shirt and other clothing constantly in contact with the body, and will infect that clothing with its peculiar taints, sticking to all its threads and filaments. And whenever sheets and bed-clothes have been saturated with the excreted discharges wiped from human bodies, they also are uncomfortable and unhealthy. Among poor and negligent people in all countries, this animal matter surcharges their cuticles, clothes and beds; and, in the heat of about 96 deg. of Fahrenheit's scale, the ordinary heat of the human body,

the moist ingredients with which the body and bed-clothes are charged, though not poisonous at first, are, by chemical and putrefactive action among themselves, changed in part to septic acid or pestilential air.

Among the poor and wretched inhabitants of the large manufacturing and commercial towns of Great-Britain, a blanket is sometimes put upon a bed, and kept there, without washing or changing, until it is worn out. The like happens to some articles of brown or black colours, which, after being put on, are never washed as long as they will hang together. In the narrow, sequestered, forlorn, unalkalized, and unventilated abodes of these persons, a poison is engendered, which often kills the people from whose excretions it is produced. The reader will recollect that it is not affirmed, for it is not true, that the excretions of these poor people of whom we are writing are commonly poisonous *at the time* of their secretion. On their *first* formation they are as free from *actual noxiousness* as the excretions of other people. But in their unhappy situations, the long accumulation and detention of the same nasty materials which befoul a shirt or a blanket, will turn to pestilence, and infect the atmosphere of a whole apartment, tenement or house.

The point particularly worthy of notice in this statement is, that the septic poison *is not secreted such* from the mouths of the exhaling arteries; but that common secreted matter, having originally nothing directly venomous, *changes by degrees to a poison, by being, after secretion, exposed to the atmosphere in a heat equal to that of the human body.*

This inanimate matter is of four different sorts: 1. *Matter vomited up* in times of sickness, both at sea and on shore, and left adhering to the floors, bedding or clothing; a very common case. 2. *Matter discharged by stool*, in cases both of health and sickness, and tainting floors, utensils, clothing and bedding; an occurrence unavoidable where there is a family of children, and frequent enough among grown persons, especially when infirm or sick. 3. *Matter discharged from the urinary and sexual organs*, more or less of which inheres to clothing and bedding. 4. *Matter discharged by perspiration*, happening to all human beings every moment of their existence, and sufficient, of itself, when accumulated and concentrated, to produce the most active and malignant poison. But the statue has none of these evacuations, and therefore remains clean.

The sufferings of men, in the early stages of society, from

the collection of these excrementitious things around them, were excessive. The diseases incidental to their uncleanness among the Jews, gave rise to many strict regulations and ceremonies in the Mosaic Law. Almost the same nasty way of living still continues among the common people of Syria, Egypt and Barbary. By a change in their religion, they have thrown off the Jewish and adopted the Mahometan faith, much to their detriment; for they are not now under equally rigid injunctions to keep their *clothes and their houses* clean. The degree of nastiness among the ancient Hebrews induced a distemper which they called *leprosy*. The greater degree of it, prevalent among the modern Syrians, Egyptians and Natolians, produces what they now call *the plague*. Among the English, the circumstances of climate and constitution under which their nastiness is worked up to poison, make it constitute a disease among the emaciated poor, which they call *typhus*. When engendered in sea vessels, from similar materials, it is denominated *ship-fever*; when in prisons from the like causes, they call it *jail-fever*; when in crowded and badly managed infirmaries, it is known by the denomination of *hospital-fever*; and when, in addition to somewhat of domestic uncleanness, the septic acid vapours of corrupting beef, fish, hides, offal, and the like, in the cities of North-America, are made to operate, under an intense heat, upon human constitutions, the malady produced has been called *yellow fever*.

How, then, the reader will ask, is the wide-spreading and sore-wasting mischief to be arrested? Being bred in contact with our bodies, and clinging to our very skirts, how can it be made to unclench its gripe or quit its hold? Experience, the mother of all useful inventions, has sufficiently shown how this can be done. *Pure air* is one of the most easy, cheap, and obvious expedients for thinning and carrying away infectious fluids when they exist in an aerial form. *It is the nature of infectious fluids to diffuse themselves around and among the surrounding bodies until they impregnate all alike, and thus find their level.* If clean atmospheric air is admitted into an infected apartment, a portion of infectious gas will join the admitted portion of atmosphere, and thereby the contaminated air will be rendered more dilute or less concentrated. And if this clean air is made to pass through in a stream or current, the infectious gas mingling with it may be wafted away, and be so attenuated, and removed so far, as to do no more harm. The operation of a clean fluid,

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Among the poor and wretched inhabitants of the large manufacturing and commercial towns of Great-Britain, a blanket is sometimes put upon a bed, and kept there, without washing or changing, until it is worn out. The like happens to some articles of brown or black colours, which, after being put on, are never washed as long as they will hang together. In the narrow, sequestered, forlorn, unalkalized, and unventilated abodes of these persons, a poison is engendered, which often kills the people from whose excretions it is produced. The reader will recollect that it is not affirmed, for it is not true, that the excretions of these poor people of whom we are writing are commonly poisonous *at the time* of their secretion. On their *first* formation they are as free from *actual noxiousness* as the excretions of other people. But in their unhappy situations, the long accumulation and detention of the same nasty materials which befoul a shirt or a blanket, will turn to pestilence, and infect the atmosphere of a whole apartment, tenement or house.

The point particularly worthy of notice in this statement is, that the septic poison *is not secreted such* from the mouths of the exhaling arteries; but that common secreted matter, having originally nothing directly venomous, *changes by degrees to a poison, by being, after secretion, exposed to the atmosphere in a heat equal to that of the human body.*

This inanimate matter is of four different sorts: 1. *Matter vomited up* in times of sickness, both at sea and on shore, and left adhering to the floors, bedding or clothing; a very common case. 2. *Matter discharged by stool*, in cases both of health and sickness, and tainting floors, utensils, clothing and bedding; an occurrence unavoidable where there is a family of children, and frequent enough among grown persons, especially when infirm or sick. 3. *Matter discharged from the urinary and sexual organs*, more or less of which inheres to clothing and bedding. 4. *Matter discharged by perspiration*, happening to all human beings every moment of their existence, and sufficient, of itself, when accumulated and concentrated, to produce the most active and malignant poison. But the statue has none of these evacuations, and therefore remains clean.

The sufferings of men, in the early stages of society, from

the collection of these excrementitious things around them, were excessive. The diseases incidental to their uncleanness among the Jews, gave rise to many strict regulations and ceremonies in the Mosaic Law. Almost the same nasty way of living still continues among the common people of Syria, Egypt and Barbary. By a change in their religion, they have thrown off the Jewish and adopted the Mahometan faith, much to their detriment; for they are not now under equally rigid injunctions to keep their *clothes and their houses* clean. The degree of nastiness among the ancient Hebrews induced a distemper which they called *leprosy*. The greater degree of it, prevalent among the modern Syrians, Egyptians and Natolians, produces what they now call *the plague*. Among the English, the circumstances of climate and constitution under which their nastiness is worked up to poison, make it constitute a disease among the emaciated poor, which they call *typhus*. When engendered in sea vessels, from similar materials, it is denominated *ship-fever*; when in prisons from the like causes, they call it *jail-fever*; when in crowded and badly managed infirmaries, it is known by the denomination of *hospital-fever*; and when, in addition to somewhat of domestic uncleanness, the septic acid vapours of corrupting beef, fish, hides, offal, and the like, in the cities of North-America, are made to operate, under an intense heat, upon human constitutions, the malady produced has been called *yellow fever*.

How, then, the reader will ask, is the wide-spreading and sore-wasting mischief to be arrested? Being bred in contact with our bodies, and clinging to our very skirts, how can it be made to unclench its gripe or quit its hold? Experience, the mother of all useful inventions, has sufficiently shown how this can be done. *Pure air* is one of the most easy, cheap, and obvious expedients for thinning and carrying away infectious fluids when they exist in an aerial form. *It is the nature of infectious fluids to diffuse themselves around and among the surrounding bodies until they impregnate all alike, and thus find their level.* If clean atmospheric air is admitted into an infected apartment, a portion of infectious gas will join the admitted portion of atmosphere, and thereby the contaminated air will be rendered more dilute or less concentrated. And if this clean air is made to pass through in a stream or current, the infectious gas mingling with it may be wafted away, and be so attenuated, and removed so far, as to do no more harm. The operation of a clean fluid,

when applied to a firm or solid body in a nastier state than itself, is called *washing*. Clean air, passing by and through infected clothing and rooms, washes away a part of their filth. This might very significantly be called AIR-WASHING, as the application of it to the human body has been aptly called the AIR-BATH. In ordinary language, however, this process of washing through the medium of an aerial fluid has been known by the name of VENTILATION.

But cases occur where VENTILATION, or WASHING WITH AIR, is either not efficacious or not expeditious enough. The nastiness and infection are either not washed out completely by it, or are removed too slowly for ordinary convenience. In such instances PURE WATER is a good auxiliary to PURE AIR. Septic poison, or, what is the same thing, infection, is disposed to diffuse itself, and find its level in clean water very readily, as well as in clean air: and water is better adapted to attract to itself, and carry away with it, gross and unvolatile matters, than air is. For the removal, therefore, of those thick, unctuous, and adhesive excretions, which do not quit their connection with the cuticle and garments, and rise in vapour, WATER has a more exact and determinate fitness than air has. Water has for this reason been, by the common usage of mankind, employed for this purpose; and the operation has been called WASHING, or, as it ought more properly to be expressed, WASHING WITH WATER.

If mankind wore few clothes to collect and confine their nastiness about them; if they lived in temperate latitudes, under open sheds, with little bedding and furniture; if they frequently used both the AIR-BATH and the WATER-BATH; and if they fed moderately upon food chiefly vegetable, whereby their excretions would be diminished in copiousness and rankness, as the natives of Otaheite seem to do; perhaps these two kinds of washing would answer most of the purposes of ridding them of their personal and domestic nuisances.

But with the greater part of the human race the case is widely different. Their shirts, breeches, stockings and coats, cover them by day, and their feather, flock or straw beds, sheets, blankets and coverlids, invest them by night. Their dwelling-places are often close and narrow: and only now and then, by way of a rarity, are the persons, clothes, beds, bedding, furniture and chambers of these families, WASHED AS THEY OUGHT TO BE, EITHER BY AIR OR BY WATER.

The condition of such mortals was unhappy to be sure.

Doomed to exist, without the purifying streams of God's free gifts of air and water, sickness and abridgment of life were the unavoidable consequences. But this situation, though for a while deemed forlorn and desperate, was found, by experience, to be susceptible of great alteration, and even of comfort. In the abundant stores of the Almighty, men at length discovered that great quantities of ALKALINE SALTS AND EARTHS had been treasured up for their relief. And they have since found that the processes for keeping up the stock of these articles will be as durable as the existence of fire, which prepares pot-ash and soda by the incineration of plants, and as lasting as the labours of shell-fish, which collect lime from the floods of the sea.

Asia seems to have been the cradle of mankind; though Egypt, a north-eastern corner of Africa, was, perhaps, the best seminary of learning in early ages. The power of alkalies to prevent corruption, to repress noxious vapours, and to give activity and dispatch to water in removing nastiness from the human skin and clothing, had undoubtedly been discovered as long ago as the descent of the grandson of Abraham to that country. There were natural circumstances in some parts of that region peculiarly favourable to these discoveries. The surface of the land abounded with calcareous rock and brine of sea-salt; and these, acting upon each other, underwent a double decomposition, whereby the carbonate of lime and the muriate of soda were changed to a muriate of lime and a carbonate of soda. This carbonate of soda lay ready to their hands in the dry season, and required little more than to be scraped together for use. Its *effervescing quality*, when the acetic acid, or vinegar, was poured upon it, is noticed by King Solomon, who flourished one thousand years before the birth of Christ; and its *cleansing power* is remarked by the Prophet Jeremiah, six hundred years prior to that era. So early was it known that the most comfortable and healthy consequences arose from ALKALIZING water, or rendering it ALKALINE.

This discovery, which was of more consequence to the physical purity, and through it to the moral proficiency and excellence of man, than the invention of the alphabet, has come down to us without its author. It belongs to some Memphian genius, whose name ought to be mentioned with those of Theban Hermes, and Syrian Cadmus.

Such a solution of soda in water was called a *lxivium* or *ley*, and afterwards all salts capable of forming a solution pos-

sessing such antiseptic, detergent, neutralizing, and sweetening qualities, were distinguished as *lixivial salts*. The theory of their operation is briefly this: soda (and the same is true of pot-ash) has a double property of neutralizing acids, and of rendering grease soluble in water. A portion of greasy as well as infectious matter inheres in garments, &c. which neither mere *air* nor unmixed *water* can wash away. But no sooner is water charged with an alkali, than, like a peace-officer authorized by a warrant, it searches every suspicious corner and lurking place, and drags forth mischief with its aids and abettors from their concealment.

Water thus to be rendered quick, safe and efficacious, ought to be *alkalized*. But as soda is not every where to be got, or if to be purchased, costs too high a price for common use, POT-ASH began to be employed in its stead. Pot-ash was gathered on every hearth where wood was burned; and in process of time it began to be understood that whosoever kept a wood-fire, to obviate the evils of cold, and guard against the severity of hunger, would find in its ashes a sovereign antidote against nastiness, infection and pestilence. Water, therefore, was alkalized with *pot-ash*, and this *lixivial salt* was substituted for soda in the business of removing corrupt excretions.

Experience, however, soon taught that pot-ash, taken hot from the fire-place, was of a caustic quality, and preyed upon the skin and flesh of those who put their hands into a ley made of it. Garments, too, soaked or boiled in this acrid lixivium, were sometimes rendered rotten, and fell to pieces on being handled afterwards. To secure the hands and the goods at the same time against this destructive alkali, another expedient was tried, and another discovery made. In almost every house, whether of a huntsman, a shepherd, or a cultivator of the earth, there were scraps and morsels of fat and other animal substances not consumed as food, and these often lay as incumbrances about the house, or were wastefully thrown into the fire. Now it was found that they might be employed for a very important domestic purpose; for the ley of the caustic pot-ash would combine with them, and in so doing there would be formed from the two a new product, possessing all the detergent and alkalizing powers of the pot-ash as respected the garments, without its corroding and disorganizing effects as regarded the hands of the washer. Thus *soap was discovered*; and such is the reason why its alkali is connected with and disguised by grease or oil.

The great and efficacious means of cleanliness are therefore

found to consist in WASHING; with, 1. Clean air: 2. Clean water: 3. Water alkalized with soda: 4. Water alkalized with pot-ash: and, 5. Water alkalized with soap. And these, when seasonably and sufficiently employed, are capable of overcoming and removing every particle of nastiness, septic acid, or infection, which are engendered on the cuticle, in the clothing and bedding of men, within their habitations, and amidst their furniture. These agents are sufficient to prevent its formation, and to destroy it wherever it exists. And wherever infection arises, as on ship-board, in poor-houses and jails, in hospitals and camps, there is always a neglect of these ventilating and alkalizing processes which make pestilence vanish before them.

We come now to the second part of the work, which is addressed, the reader remembers, to the College of Physicians of Philadelphia, on the prevention of the American pestilence. In this he applies his opinions concerning the imaginary typhous contagion, to explain the origin, progress and prevention of what he deems pestilential contagion. Having offered our reasons for disbelieving altogether the existence of contagion in typhus, we shall not repeat what we have frequently published against the presence of contagion in yellow fever, but refer our readers to the passages. (See Med. Rep. vol. iv. p. 167. vol. v. p. 72). We agree with Dr. H. that the two distempers are analogous cases. Though we do not say, with him, that typhus is contagious, and, by analogy, yellow fever is contagious; but we being convinced, and that conviction strengthened by Dr. H.'s own evidence, that there is no contagion in the former, are also convinced, by parity of reasoning, that there is none in the latter.

In a strain of deep concern, he laments the evil hour when Dr. RUSH ascribed the distemper of Philadelphia, in 1793, to local and domestic causes (p. 146). He pronounces that the ACADEMY OF MEDICINE in Philadelphia have alledged the most frivolous, inadequate and groundless causes of this calamity (p. 147). He charges Dr. CALDWELL with great declamatory parade, bold assertions and flowery diction, and of self-contradiction and condemnation (p. 151). He affirms that such vague and ill-founded notions have obstructed the measures of government in all the sea-ports of America (p. 153). He is sincerely sorry that Mr. WEBSTER should publish such whimsical and irrational opinions as are contained in his History of Pestilential Diseases (p. 155); and observes, "that an author of this kind would require no notice, if the positive and plausible style of his book did not occasion ap-

prehensions that it might mislead the unwary reader." (p. 157). To the disingenuous spirit of these observations we make no reply, as the injured gentlemen concerning whom they are made are more able than ourselves to justify their opinions, or to recriminate.

With the kind intention of counteracting, as far as in him lay, the tendency of these doctrines, Dr. H. wrote to his very intelligent correspondent, Dr. WATERHOUSE, asking a number of questions about the pestilence in the United States, and extolling CHISHOLM's book of positive declarations as a most intelligent account of it in the West-Indies. Dr. Waterhouse waved or evaded a direct reply, by writing that he could not gratify him by giving answers to his interesting queries, on account of the contradictory state of medical opinion. Frustrated in this attempt, twice made (in 1798 and 1799), to obtain the requisite information from the worthy professor at Cambridge, Dr. H. addresses himself, as a last resort, to the learned College of Physicians in Philadelphia, and accompanies his letter to them with a copy of the letter so unsuccessfully sent to Massachusetts. And to encourage them to do something, he informs them he has deliberately and impartially considered their pamphlet (reviewed in *Med. Rep.* vol. ii. p. 404), and "has been convinced, by the clear, consistent, and complete evidence which they have adduced, that the contagion was introduced into America from the West-Indies," &c. He calls upon them as a society, constituted by government, with a peculiar duty to discover the nature of this contagion, and the laws by which it is propagated, and to advise regulations for its prevention. He solicits them to appoint a committee of inquiry for the purpose, and to write him full and explicit answers to his queries; and observes to them, "that none but active and zealous members, eager in the pursuit of improvement, ought to engage in the undertaking."

We are pleased with the seasonableness and solemnity of this exhortation, and hope it will produce the desired effect upon the respectable gentlemen to whom it is addressed. The HOUSE OF CONTAGION claiming title as sovereign, by descent and prescription from a long line of ancestors, over vast territories in the medical world, is losing its popularity and power, like some other great houses. Its dominions are in a tumultuary condition, and several of them are in a state of open heresy and rebellion. The large and populous provinces of FEBRIFLAVA, PESTIS, DYSENTERIA, and TYPHUS, have already abjured the authority of such usurpers and tyrants, and

have declared themselves free and independent. These unexpected and daring events have spread uneasiness and alarm throughout the whole realm; and where the encroachment and evil example of these undutiful subjects may end, cannot be conjectured even in the cabinet. Nothing is thought of but a dismemberment of the empire; whereby, if the CONTAGIONS are not wholly dethroned, they will be deprived of at least more than half of their ancient and hereditary possessions.—To oppose the bold and active leaders in these innovations, it becomes all the friends of the old establishment to rally. Not a moment is to be lost: for by tardiness and neglect, it is certain the opportunity of reuniting these disaffected provinces under their former head will be irretrievably gone. It is by vigorous proceedings alone that an end can be put to the prevailing turbulence and division; yet these must be tempered with much prudence and forbearance; for too much vigour, like the energetic conduct of ALVA, the vicegerent of PHILIP II. will be the most effectual method of accomplishing the very event it was intended to frustrate.

In the interim, while these things are resolutely doing, and under such happy omens, for the good of the cause, we take our leave of this work, by recommending to its ardent and inquisitive author the accounts of the *local origin* of the distemper at Boston, by Drs. Rand and Brown (Med. Rep. vol. ii. p. 360, 442); at New-London, by Drs. Channing and Coit (ibid. p. 372, 375, 377); at Baltimore, by the medical faculty there (ibid. vol. iv. p. 351); at Norfolk, by Drs. Selden and Whitehead (ibid. p. 329); at Charleston, by Dr. Ramsay (ibid. p. 217); important collections of testimony, of which he seems to be entirely ignorant. We refer him also to the facts proving its *local origin* in the interior of New-York and Pennsylvania, and the western country on the Ohio (ibid. p. 73, 74, 75), without a suspicion of importation; and to the history of its *local origin* on board several ships in the American navy (ibid. p. 1, 234, 244); and in the port of Cadiz, in Spain (ibid. vol. v. p. 103); and lastly, the facts related by Dr. Vaughan (ibid. vol. iv. p. 45), and Dr. Barker (ibid. p. 149), and the too much neglected publication of the late Mr. Bayley, on the Yellow Fever of New-York in 1795, may serve to augment Dr. Haygarth's deficient stock of knowledge.

ART. III. *Medical and Physical Memoirs, &c. By Charles Caldwell, M. D. &c.*

[Continued from p. 66.]

MEMOIR II.—*Facts and Observations relative to the Origin and Nature of the Yellow Fever.*

THE principal part of this memoir, which is comprised in ten numbers, and addressed to the citizens of Philadelphia, was originally published in the autumn of 1799. The chief points which the author endeavours to establish are the following: I. That the late malignant epidemic of the summer and autumn, in Philadelphia and other cities of the United States, was not a contagious disease. II. That consequently it was not an imported disease. III. That it was only a modification or more malignant grade of the common bilious fever of our country. IV. That it was essentially different from the typhus mitior, or jail-fever.

Dr. Caldwell's reasons for disbelieving the contagiousness of yellow fever are—1. The existence of a similar disbelief among the most experienced and enlightened physicians of the West-Indies, as well as among a great majority of those of the same description in our own country. 2. Its not spreading in the country, nor even in towns beyond the range of vitiated atmosphere. 3. The immediate extinction of the disease by frost. 4. The want of a specific character, and definite period as to the duration of the disease. And, 5. The indefiniteness of the interval of time between the reception of the poison and the commencement of the disease.

Dr. C. rejects the importation of the yellow fever, and asserts the origin of it from domestic sources on the following grounds: 1. Because it is not a contagious disease, and, therefore, must be incapable of importation. 2. Because it was never introduced into Philadelphia from the year 1762 till 1793; notwithstanding the want of quarantine regulations during an extensive and uninterrupted intercourse with the West-Indies. 3. Because it has never been conveyed into Britain or France, notwithstanding the exemption of West-India vessels from the restrictions of quarantine in all the ports of the mother countries. 4. Because all attempts to trace the importation of the disease, and to ascertain the channel of introduction, have proved unsatisfactory and abortive. 5. Because it is the constant product of putrefaction in other warm

climates abounding in vegetable and animal filth, and, therefore, cannot fail to result from the same cause, under the tropical temperature of the summer in this country. 6. Because it has never been known to prevail in this country, except during those months in which, from the influence of preceding heats, the atmosphere has been loaded with putrid exhalations. 7. Because the yellow fever prevailed among the aborigines of this country prior to the existence of commercial intercourse with the West-Indies, and now is known to prevail in many places remote from maritime situations.

Dr. C. supports the opinion, that yellow fever is only a higher or more malignant grade of the common bilious fever of our country, by stating that these diseases appear and disappear at the same seasons of the year—that they appear only in situations of the same description, being confined exclusively to such as abound, more or less, in putrid exhalations—that persons of the same description are most liable to the attack of each—that they are ushered in in the same manner, exhibit symptoms differing only in degree, and commit their principal ravages on the same organs and parts of the body—that they often give rise to the same forms of chronic disease—that they may be reciprocally converted into each other—that they are alike destitute of the power of contagion—that the progress of both these forms of disease has been, at times, arrested by a continuance of dry and warm weather—that they frequently prevail in the same place at the same time, and, therefore, under the same constitution of atmosphere—and, finally, that they yield to the same remedies, modified and urged with different degrees of force, according to the state and grade of the existing disease.

We are glad to find that Dr. C. in the course of his reasoning on this subject, has so pointedly availed himself of the inferences to be drawn from the sudden disappearance of yellow fever after the coming on of frost. To our minds, this extinction of it by cold has always appeared to be a pregnant and instructive fact, deciding its real nature and origin more positively, perhaps, than any other which can be adduced. This fact must establish the generation of it by putrefaction, and proves, moreover, that its epidemic appearance arises from a general vitiation of the atmosphere within certain local ranges, produced by that extensive surface of putrid matters which overspreads our docks, slips and wharves, and bestrews our streets, back-yards and cellars, and not from any thing engendered in or issuing from the bodies of the sick, or

the chambers in which they lie. On this supposition the extinguishing power of frost may be easily understood; for the effect of it in arresting putrefaction is well known, and it is equally known, that to all such sources of putrefaction as we have just mentioned, frost finds ready access. Hence, too, we can explain the fact so often observed, that multitudes take the disease who merely live in or frequent certain pestilential streets or situations, without seeing or approaching the sick, the clothes or bedding of the sick, any other substances imbued with their exhalations, or the vessels pointed out as the source of the imported contagion.

But in attempting to derive yellow fever from human contagion, how shall we account for the sudden disappearance of it after sharp frost? Contagious diseases are not subject to extermination by such a power. When cold weather comes on we close our rooms, we increase the quantity of bed-clothes, and we excite artificial heat by the burning of fuel. Our bodies, preserving a uniformity of temperature throughout all seasons, suffer no abatement of heat at the arrival of winter; we keep our apartments comfortably warm in the most rigorous weather; and patients labouring under yellow fever at the conclusion of the epidemic season, by additional weight of bed-clothes, and by the heat of fires kindled in their chambers, find a compensation for the atmospherical warmth which no longer exists. What, then, can be the operation of frost in such apartments, and upon the bodies of such persons? Why do not the sick, immersed in such a degree of heat, continue to communicate their disease to all or to most of those who approach their beds? And why is not the disease, in this manner, continued by succession from one person to another throughout the whole winter?

This principle will be confirmed and illustrated by contrasting the extinction of yellow fever by frost with the increased prevalence of typhus or jail-fever during winter. The latter disease chiefly springs from the condition of things within doors, as the former principally from the state of the air out of doors. The one may be generally ascribed to the defects of domestic economy—to the poverty, filthiness and crowdedness of private families; the other to the neglect of police regulations calculated to secure the public health. The exhalations, and other excretions of the human body, confined, accumulated, becoming putrid, and thus emitting a poison which adheres to the skin, clothes, bedding, furniture, utensils, walls, &c. generally give origin to typhus among the

crowded inhabitants of small, low and filthy dwellings; while larger masses of putrefying animal and vegetable substances, overspreading greater space, and thereby vitiating extensive portions of the atmosphere, produce the epidemic prevalence of yellow fever as it rages in cities, or in certain spots of the country. The heat of the human body, operating upon the filth of collected excretions, unopposed by the diluting and cleansing processes of ablution and ventilation, produces, on the small scale of a crowded room or house, results in many respects analogous, but in some other respects dissimilar, to those observed on the large scale of a city, where vast masses of putrid matter are acted upon by the sun. In both cases a fatal poison is generated. In the case of typhus, the poison, originating from filth accumulated within a small space, reaching and adhering only to whatever lies in contact or very near to it, can spread only to the distance of a few feet from its source, and, consequently, can never produce an epidemic disease. As typhus likewise depends upon animal heat, aided, perhaps, occasionally, by the heat of a fire, upon want of cleanliness, which may equally exist at all seasons, and upon want of ventilation, which is more apt to be carried to an extreme in temperate than in hot climates, and in cold than in warm seasons, it is not extinguished, but rather acquires additional vigour in winter. The reverse of all this happens in the production of epidemic yellow fever. Putrefaction from numberless sources, fed by a never-failing supply of dead animal and vegetable filth, expanding a surface of vast extent to the heat of a burning sun, generates, in this case, a wide-spreading poison, which can only be extinguished by frost sharp enough to destroy the existence of its parent.

Hence we may satisfactorily account for typhus being generally a disease of temperate or cold climates, seldom appearing within the tropics, and often committing its greatest ravages in the winter; while yellow fever is a perpetual endemic within the tropics, especially to new-comers, and in more temperate regions can only rage as an epidemic in summer and autumn, and is immediately arrested by the cold of winter. Hence, too, we may explain why typhus chiefly attacks the weakly, more frequently females, and especially such as suffer from a deficiency of nourishment; while, on the other hand, yellow fever makes prey of the robust, vigorous, active, plethoric and well-fed part of the community. Hence, likewise, we can understand why typhus never spreads as an

epidemic, through whole cities or tracts of country, banishing all other diseases, or imperiously forcing them to assume its symptoms; while, at the same time, we obviously comprehend the tendency of yellow fever to exhibit all these remarkable phenomena. On the same principles also we account for the slow and gradual approach and chronic duration of typhus; as well as for the rapid onset and quick termination of yellow fever.

In the fourth place Dr. C. offers his reasons for asserting an essential difference between typhus and yellow fever. A principal ground of difference, which he labours to establish, besides those which we have already mentioned, is the contagiousness of the former; a point in which our readers will recollect that we have formerly stated our dissent from this respectable writer.* He justly supposes the contagion of typhus to be the result of a *morbid* secretion. But is it not difficult to reconcile this supposition to the fact of the wretched inmates of dungeons infecting those who approached them, when brought out into public, while they themselves had remained without *disease*?†

(*To be continued.*)

* See Med. Rep. vol. iv. p. 408.

† As it happened at the Black Assizes at Oxford in 1571, and on several occasions since that time.

Dr. Haygarth himself, the great apostle of febrile contagion, admits that a typhous patient, removed from the filthy dwelling where the illness was contracted, stripped of infectious clothing, thoroughly washed and cleansed, and lodged in a spacious and ventilated chamber, seldom or never communicates contagion to such as approach his bed. Does not this fact greatly resemble the acknowledged non-contagiousness of yellow fever, when the patient is carried out of the range of vitiated atmosphere into the pure air of the country?

[*Letter to Dr. Percival on the Prevention of Infectious Fevers,*



MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

Experiments, Facts and Observations in Natural History, made during the Autumn of 1801, by Samuel L. Mitchell.

1. EXPERIMENTS AND OBSERVATIONS ON THE BLACKNESS OF BODIES, SHOWING THAT BLACKNESS IS NOT PRIVATION OF COLOURS.

AS I was making some experiments the other day with a small thermometer upon bodies of different colours, exposed to the rays of the sun, then shining very bright, I was struck with an appearance I had not so particularly noticed before on the surface of *black* bodies. As my thermometer was lying on the black hair-cloth bottom of a mahogany chair, near the window, in the sunshine, I observed the white light or sun-beam, so refracted as to exhibit the prismatic colours, and reflected, after refraction, plainly to the eye, while those parts of the cloth which were not so brightly illuminated, or which were not exposed to the direct rays of the sun, appeared of the ordinary black colour. On moving these black or feebly illuminated parts of the hair-cloth into the sunshine, they likewise reflected prismatic colours; and, on withdrawing them into the shade, the light was refracted and reflected too feebly to be distinguished into colours, and they returned to their former blackness. The quick-silver of the thermometer, lying on the hair-cloth which so refracted the sun-beams, and reflected their prismatic colours, had risen to a height many degrees above the temperature of the parts on which, by reason of feeble refraction in the shade, no colours were distinguishable by my eyes.

Here, then, was a confirmation of the common experiment of heat accumulated in *black* bodies exposed to the solar radiance. And there was more than that: There was evidence plainly submitted to my sense of seeing, that a certain black body did not absorb the white or undecomposed rays of light, but did decompose them in a considerable degree, and reflect coloured light of all the iridescent hues to the organ of vision.

To know how far this quality of black horse-hair corresponded with other black substances, I exposed *black silk* to the sunshine, and saw the prismatic colours plainly on its filaments. I then examined the *black bristles* of swine, and beheld a similar reflection of colours from their surfaces. Afterwards a *black dyed hat* was exposed to the rays, and rainbow colours were reflected from the sides of the *fur* and *hairs*. Also *black leather* boots, and a *black paper* snuff-box, were iridescent in the sunshine. The like was observable of *black varnish*, the polished surface of which, in the sunshine, was prismatic too. *Black wool* and *woollen cloth*, subjected to the light in the same manner, gave a like result. A *black ink-stand* and a *seal*, of *Wedgwood's earthenware*, decomposed the sun-beam, and reflected rainbow colours too; and these, like the rest, when removed beyond the limits of distinct vision, affected the eye with a sensation of *uniform blackness*.

What, then, is this *black*, which the Newtonians teach to be a negation or privation of all colour? Why, truly, a very different state of things indeed. So far is a black body from being the absence of all colour, that its peculiar complexion depends upon its being a co-existence of all the rainbow colours. These had undergone refraction on innumerable points, angles or roughnesses of an almost infinite smallness. Therefore, these coloured rays being too small, or possessing individually too little of the matter of light to be vivid, and being too much confused with other colours to be seen distinctly, make up, by their joint operation, the *mixture of colours* which is called black. All coloured bodies possess the power of refracting light in a certain degree, and of reflecting some or other of its hues; and, of all bodies with which we are acquainted, those which are denominated black affect this separation of colours in the most complete manner, by a more minute and exquisite subdivision, and a more scattered and mingled reflection than other bodies present.

White has been defined, by the natural philosophers, to be the presence of all colours, and *black* their absence. It would be much more correct to say, *White is the reflection of solar rays in their compound or undivided state; while BLACK is the reflection of the same rays after an almost infinitely small resolution or decomposition: Or, white is the absence of all distinct and sensible colours, and black is the presence of all: Or, again, white is the effect of heterogeneous, and black of homogeneous light.*

The fine experiments of Dr. Herschell have shown, that white light, after undergoing the operation of the prism, emits heat; or, in other words, its *illuminating* rays are accompanied with *calorific* rays. This I suppose to happen thus: Light is a fluid, and, like other fluids, owes its fluidity to latent heat: whenever the composition of this compound of light and caloric is severed by the prism, a considerable portion of caloric is disengaged, and passes from a latent to a sensible state. And agreeably to Count Rumford's doctrine of heat reflected in strait lines from bright surfaces, this disengaged caloric is of the radiant kind.

But the glass prism and the watery rain-drop are not the only bodies which untwist the white sun-beam. All coloured substances effect the same in part; but the deepest black accomplishes the work most completely, and shows, by themselves, all the delicate and slender threads of that wonderful cord. The spots on the top of Newton's soap-bubble, appearing in the midst of the prismatic circles which are so bright and beautiful, have been supposed to be analogous facts. These spots, however, are not *black*, but perfectly pellucid: they permit light to pass through without reflection, and are the same that the pupil of the eye would be was there no black pigment within the choroides. The *prismatic spectrum* and the *rainbow* present the primitive colours in succession, according to their respective refrangibility: *black bodies*, on the contrary, exhibit them without such regular sorting or classification, confusedly as they happen to bespatter the surface.

There is an experiment of Newton's so pointed and unequivocal, that it is wonderful that great philosopher did not interpret it as it ought to have been: I mean the decomposition or the division of heterogeneous light, and the splitting it into its homogeneous parts or colours by the fibres of a black ribbon held between the eye and the sun. In this experiment the white or compound ray is most elegantly divided by passing through the silk into its prismatic colours, and reaches the retina entirely divested of its glare or splendour. The prismatic colours most beautifully embellish the cloth. During this process, the latent heat of the sun-beams being disengaged, and exhibited in a sensible form, becomes capable of raising the quick-silver in thermometers, and augmenting the temperature of other bodies. Hence black, which has the greatest power to shatter, split or dissever the white or heterogeneous rays of the sun, is the warmest of all co-

lours, by virtue of the larger proportion of sensible caloric disengaged from those rays. The different shades of black are warm in proportion to their capacity of decomposing sun-beams, and separating latent heat from them.

It is a mistake that black bodies absorb all the rays of light. Although it has been made an optical aphorism "that the blackness of bodies proceeds from their incapacity to reflect any of the rays of light," yet it is certain that light is reflected from some black bodies, as black bottles, black marble, black leather, &c. very powerfully. Black may then reflect light; and, when this happens, the bodies so constituted are proportionally cool, because they send back the sun-beams entire, without abstracting their caloric.

When many sun-beams are condensed in the focus of a mirror or lens, and thrown upon an opaque inflammable body, so much light is decomposed, and so much caloric extricated in a small spot, as sometimes to set it on fire. This effect evidently proceeds from the caloric separated from fluid light, and assuming a sensible or thermometric form.

These observations and experiments are intended to reconcile certain difficulties in Sir Isaac Newton's doctrine of light, to show how Dr. Herschell's experiments may be interpreted, and to give a proper idea of that condition of bodies denominated *black*. As to Lewis's numerous experiments on black, in his history of colours (*Philosophical Commerce of Arts*, p. 315 & seq.), they are not devised in such a manner as to throw light on the constitution and theory of this colour, but merely to improve and economize processes in the arts where *black* is employed.

Sept. 16, 1801.

2. REMARKABLE SERPENT (BOA CONSTRICTOR) KILLED ON LONG-ISLAND.

On the 28th of September, 1801, a serpent, of a species unknown to the people of the neighbourhood, was killed in a swamp at Islip, in Suffolk County, New-York. They had no vulgar name for it. Its length was seven feet and four inches, and its thickness proportional, being around the swell about the size of a man's wrist. It was on the belly and sides of a yellowish or straw colour. On the back were thirty-six black spots, reaching in a row from the head to the tail; and on each side of this row, approaching the belly, were many other blackish or dark brown spots. These gave it a speckled appearance, and there were no stripes. It had

no fangs or biting-teeth to pierce the bodies of its enemies, and insert poison; and, therefore, was not venomous. In the lower part of the mouth there was a considerable fleshy portion like a tongue, which terminated in a long bicuspidated projection. The jaws were furnished with hooks or hamated teeth, in the manner common to snakes. It had scuta both on the belly and tail; and these amounted to about three hundred. From these characters, it appeared to me, when I examined the serpent soon after it was killed, to belong to the genus of BOA. The number of the scuta so exactly corresponds with the species termed CONSTRUCTOR, that the *boa constrictor* may be enumerated among the American serpents. This is the creature which is said to grow in India to the length of thirty feet and more, and to crush animals to death by twining around them; though in the United States it is not yet known to grow to so large a size.

3. BEAUTIFUL SPECIES OF SOLANUM FOR FLOWER GARDENS.

Several species of the numerous family of solanum are already in the gardens and green-houses. To say nothing of the common nightshade and potatoe, it may be remarked, that the *egg-plant*, the *Jerusalem cherry*, and the *bitter-sweet*, have attracted no small share of attention. The species which are cultivated for the purposes of taste and ornament are valued not for the beauty of the blossom (for the flowers of the solanum are not remarkable for their gaiety), but for the agreeable habit and aspect of the whole plant, or for the singularity of its fruit. The mature pericarpium of some of the species bursts open, and gives an appearance quite as handsome as petals, pistils and stamens, and greatly more singular and durable. The *solanum dulcamara*, about the time it drops its leaves in October, opens the high orange-coloured trivalvular capsules of its berries; and these retracting, disclose the scarlet trilocular pulp in which the seeds are enclosed. And clusters of these smooth disparted berries, dependant from their green foot-stalks, have been employed to make a fine and showy appearance on chimney-pieces, among dried flowers, during the whole winter.

But there is a more beautiful species than this, growing not in the form of a vine or scandent plant, but of a delicate little shrub. Its bark is green, its twigs slender and flexible, its leaves dark green, and much like those of the Jerusalem cherry. In its wild state it grows from three to five or six feet high.

It was discovered in a swamp in North-Hempstead, on October 16, 1801, in full maturity. The shrub is perennial, and bears, like other indigenous vegetables, the rigour of the seasons. Its greatest peculiarity is its seed-vessel. The leaves grow in pairs on the stems; and from the axilla, on each side of the stem, a foot-stalk arises, supporting a single fructification. This foot-stalk, which is green at its origin, turns of a reddish purple about half an inch before its connection with the capsule. This is of a beautiful *crimson* colour, rough on its outside, and split into *five* equal divisions. Between the sides of these separated portions, *two purple* webs or membranes are extended like curtains. These were formerly the two internal parts of the locuments enclosing the seeds; but now, on the expansion of the capsule, and the receding of the apices of its portions further and wider apart, they are drawn from their former central situation; and with them the seeds, which are turned completely out of their original places. But the seeds, though thus removed, do not drop off. On the contrary, they remain attached by their umbilicus to a portion of the membrane, and adhere to it with firmness enough to be handled, and carried from place to place. They are five in number, very smooth and glossy, of the size of small pease, and of the brightest orange, scarlet, or high yellowish red colour, and seem to hang from the extremities of the five points of the divided capsule.

The appearance of these *scarlet* seeds depending from their *purple* membrane, near the extremities of the *crimson* capsule, is very singular and uncommonly beautiful, especially as these gay colours are so finely contrasted with the different shades of *green* in the bark and leaves.

This elegant shrub ought to be introduced into ornamental grounds and gardens without delay.

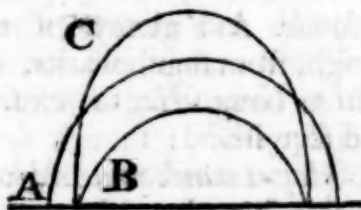
4. THREE RAINBOWS SEEN AT ONCE.

On Saturday, the 17th of October, 1801, there was a meteorological phenomenon, which I had never seen before, and which was new to others who saw it with me. The weather had been rather unsettled during the forenoon, though not stormy. There had been sunshine and cloudiness by turns. The wind blew gently from the south. A few drops of rain had occasionally fallen. At length, between three and four o'clock in the afternoon, the clouds gathered and thickened to such a degree as to threaten a considerable rain. But these appearances, in some degree, soon vanished; for there fell

only a thinly-scattered shower, which extended for several miles: but it was so trifling, that the writer of this account, who was exposed to it, was not wetted through his ordinary clothing. The rain-drops continued to besprinkle the earth until about five o'clock, when the clouds began to break away; and between them, for a time, the rays of the western sun penetrated, and shone upon the descending drops. Close behind me, sunward, was the bay, a body of water about one quarter of a mile wide.

At this juncture, towards the north-east, in the region opposite to that of the declining sun, *three* rainbows appeared. Two of them were in no respect different from common rainbows. Like them they were high, and made a wide arch, exhibited vivid colours, and these, in the *two*, were in the usual inverted order.

But the peculiarity was in the *third* bow, which was seen *between the other two, but had no parallelism with them*. It crossed the outer one at an angle of perhaps thirty-five degrees: thus, where A and B represent the common interior and exterior rainbows, and C the arch of the *third*:



The order of the colours in the bow C corresponded to their order in B: for the red rays were on its exterior part, and not on its interior, as in A.

MUSCHENBROECK (*De Meteoris Aqueis*, § 2437) mentions such an one as having been seen by Dr. HALLEY in 1698. Some appearances of the same kind have been observed by OUTHIER and CELSIUS.

Dr. HALLEY (*2 Lowthorp's Abridgment*, &c. p. 189) thinks the secondary arch was produced by the beams of the sun reflected from the water a little behind the spectator's back; and, in reality, was nothing more than the part of the circle of the iris, that would have been under the earth, bent upwards by reflection; but I am not of the same opinion.

Dr. Halley remembered not to have read of any such iris in any author.

5. ADDITIONAL ARTICLES OF MY REPORT TO THE AGRICULTURAL SOCIETY ON THE MINERALOGY OF NEW-YORK.

[To be added to the description of the islands. See our vol. iii. p. 325.]

(A. A.) *Shelter-Island*, or, as the Indian name expressed it, *Sheltered-Island*. This island, of about seven miles long and four broad, is situated in Southold-Bay, about twenty miles east from River-Head, and between the towns of Southold and Southampton. It is a distinct town in the county of Suffolk. It is higher than most of the surrounding land on Long-Island. Its soil consists chiefly of silicious gravel and grit, and a very sandy loam. The large rocks on the north side, and over the face of the land, are *granitical*, like those of the larger island, with which this was evidently once connected. They are solitary. There is a huge rock of grey *granite* within about fifty rods of the Commissioner's house on Long-Island, twenty-five feet high, and with a very broad base. In this the stratification is from N. E. to S. W. But nothing of this is discernible in the smaller and moveable rocks thereabout.

(B. B.) *Hog-Islands*. As a narrow current divides Shelter-Island, on the north side, from Southold, so another strait, on the south, separates it from *Great-Hog-Island*. This is rather a peninsula than a perfect island; though the isthmuses which connect it to *Little-Hog-Island*, and this latter to Southampton, are frequently overflowed at high-water. The body of these two fragments of Long-Island present very uniform appearances. The same sandy loam constitutes the soil; and, in like manner, quartz and other granitical gravel forms isthmuses and beaches.

(C. C.) *Robin-Island*. A small remnant of a few hundred acres lying in Southold-Bay, not materially differing from the rest.

(D. D.) *Montogue*, or *Montock*. A piece of land of about ten miles long, connected with Easthampton beyond the village of Ammaganset, by the beach or *Isthmus of Nepeague*. This is a low, sandy communication, and has every appearance of having formerly been upland. On the north side of it the sea has made a large inroad, called Nepeague-Bay. High tides, during storms, sometimes break over the whole isthmus. Pines, beach-plumbs, crane-berries, and a variety of other shrubs, grow upon it. Its length is about four miles. Just as you descend to it you pass a solitary rock of grey gra-

nite as large as half a hay-cock. Beyond rises the land of Montock. It is a high and uneven piece of ground; and on the south side the banks are in many places steep and rugged; for they are constantly crumbling down and wasting away, by the inland floods on the one part, and the Atlantic waves on the other. It abounds with granitical rocks and stones, though they form no regular strata; and in one place there is an appearance of reddish ochre. On its eastern extremity stands the Light-house, which is an handsome structure, of one hundred feet high to the top of the lantern. In the vicinity of this public building the mineralogy of the place can be well observed; and feldspaths, quartzes, shoerls, micas, and their various mixtures, be plentifully gathered in the field and on the sea shore. Here the land is wasting very fast; and a part of the cliff, within a few rods of the Light-house, is so far undermined by the sea as to be almost ready to fall. From this place *Block-Island* was plain in sight, distant near twenty miles, and probably once connected by intervening land.

(*E. E.*) *Manchonack*, the *Isle of Wight*, or *Gardiner's-Island*, is an irregular body of land, lying obliquely between *Montock* and *Oyster-Pond* points. The body of the island, with its skirts and beaches, amounts to about three thousand acres. It is of a very irregular form, and, from one extremity to the other, measures about nine miles. From one side a long beach projects three miles northwardly towards the Gull-Islands; and from the opposite extremity, on the other side, there is a beach almost as long, which extends southwardly towards Nepeague. Thus the island and its beaches form a long and strong barrier against winds from the N.E. E. and S. E. and protect vessels from their violence. Within this island is a capacious and safe place for shipping to resort to, called *Gardiner's-Bay*, where there is deep water and good anchorage. It was held originally under a Massachusetts title, confirming an Indian deed, and afterwards granted anew, during the reign of Queen Ann, as a part of the Duke of York's government. By the original grant the proprietor had large powers, of the feudal kind, amounting, as some think, to the holding a Court Baron, and of enacting laws. It is now a part of the town of Easthampton. Capt. Kidd, the famous pirate, frequented this bay, and did occasionally leave some of his spoil and treasure on the island, as appears by a curious receipt, still extant, from the Governor of Massachusetts to one of the former proprietors, for a parcel of gold

and gems which he had left there, and which were seized by the government. Hence have arisen the popular tales and traditions, current every where among the islanders in these parts of America, of hidden treasure left in places innumerable by the pirates. The mineralogy of this spot is in no respect memorably different from those which have been mentioned. The stone fences on the farm are made of granitical minerals of many varieties. Here too the earth is crumbling down, and yielding to the impulse of the waves: for, besides the wasting of other parts of the shore, a part of the island, which was formerly connected with a point or head land by a high beach, has, within a modern period, been separated by the tide. The separated portion is called *Ram-Island*.—*Mancho-nack* is a single farm, managed by its hospitable proprietor, *John Lion Gardiner*, and is famous for its beef, mutton, butter, cheese and wool.

(*F.F.*) *Plumb-Island*. There can be no reasonable doubt that this detached piece of land was formerly connected with Long-Island, at Oyster-Pond point, from which it is now distant about three-quarters of a mile, in a north-easterly direction. The Indian tradition is, that the distance was formerly very small. The passage is now called *Plumb-Gut*, and is one of the great thorough-fares of navigation hereabout.

(*G.G.*) The *Gull-Islands* are two small portions of land and rocks, lying N. E. of *Plumb-Island*, and were apparently once connected with it, and with each other. The north-easternmost is about three miles distant from Oyster-Pond point.

(*H.H.*) *Fisher's-Island* was claimed as a part of the Duke of York's government, and is now comprehended within the town of Southold. There is a series of rocks, reefs, and shoals in a N. E. direction from the N. E. Gull-Island, about seven miles, until Fisher's-Island begins. Evidently these are the remains of the ancient continent, which many ages ago stretched across this space. This portion of the acquired dominion of the ocean is called, on account of the violence of the currents, the *Horse-Race*, and is another of the great channels through which vessels pass. The island itself is a considerable monument of the old mineralogical arrangement, before the turbulence of the ocean disturbed its settled repose, and introduced many sad and ruinous innovations around it. It is separated from the continent, or shore of Connecticut, by a strait, called *Fisher's-Island Sound*, a third opening for the accommodation of mariners.

Of the tides in the Great Long-Island Sound it is remark-

able, that at the city of New-York its rise and fall is about six feet; at Cow-Bay, near the Commissioner's mills, seven feet and six inches, or a little more; and at Montóck only two feet and one half, or three feet. Of tides in the Hudson, or North River, the rise and fall at Pollepel's-Island is somewhere about four feet; at Kinderhook five and an half feet; at Albany about one foot.

It is observable that the northern and southern divisions of the east end of Long-Island, and the whole of the adjacent isles, possess a more equable climate than any place the Commissioner has visited along the sea coast; for in the winter the great body of adjacent and surrounding ocean prevents the occurrence of considerable cold, snow falls in but moderate quantity, and the earth is not sufficiently refrigerated to keep it long from melting; and during the summer the same oceanic influence hinders the accumulation of great heat, insomuch that the ripening of wheat, flax, and other vegetable crops is between eight days and two weeks later than in North-Hempstead and the other western parts of the island. From this cause it happens that they have little sleighing and late harvests.

From River-Head, eastward, the elevation of the land is so inconsiderable that few mills are moved by inland streams; and the very moderate swell of the salt water is not very favourable to the erection of tide-mills. Water machines of these kinds are therefore so few and distant, that the greater part of the corn is reduced to meal by wind-mills.

October, 1801.

6. WEAPONS OF THE AMERICAN ABORIGINES.

Some time ago a large number of figured stones were found on the farm of Mr. Cortelyou, on the west end of Long-Island, near the Narrows. They were in one collection, and amounted to about a waggon-load. Their length was from six to eight inches, and their breadth from two inches to two and a half. One end was shaped as if to be fastened to a wooden handle, and the other was rounded off, or brought to a sharp point; both sides were thinned to an edge. Such is their figure, that when fastened into convenient handles they must have made formidable pikes or spears. They were evidently intended for offensive weapons. It was at first supposed that the place where they were discovered had been the *magazine* or *armoury* of the natives; but, on further consideration, we are inclined to believe it was a *manufactory* of this sort of arms: for after examining and comparing about fifty of the stones which were

forwarded to us, we find that very different degrees of workmanship have been bestowed upon them; some being as nicely finished as the skill of the artist would permit, and others being in quite a rude state, as if they had only been roughly dressed out. The earth of which they are composed is a *black flint*, which most readily strikes fire with steel. The surface of every one of the stones exhibits the silicious concavo-convex fracture; for they have all been brought to their present forms not by grinding and polishing, but by well-directed pecking and striking. Whence the natives procured the material of which these weapons were made is not known; for none of it is found in the adjacent part of the country at this day. Upon the whole, these instruments, whether we consider them as intended to spear fishes, to transfix wild beasts, or to destroy their enemies of the human species, give a curious illustration of the state of the arts among a people not yet acquainted with the use of metals.

7. THE GLOW-WORM (CICINDELA.)

This insect (for it is such, though called a worm) is a native of Long-Island. It appeared in great numbers in September and October, 1801, in moist pasture land, beside fences and beneath locust-trees. Their light was on the tail or posterior extremity of the body, like that of the *fire-fly* or *lightning-bug* (*lampyris*). At times, seemingly at the option of the animal, it was kindled up to remarkable brightness. On some of the fine evenings of October, the appearance of these *glow-worms*, laying thick among the grass as we walked over it, was as that of fiery coals, and made a brilliant exhibition as they bespangled the ground.—The animal neither stings nor bites—seems very innocent, and may be handled with safety. It is apterous, is near an inch long, and much resembles the *millepedes* in shape.

8. INTERESTING PARTICULARS OF THE AMERICAN CENSUS, ENDING MAY 1, 1801.

By the enumeration of the people of the United States, it appears that the whole population (excepting Tennessee* and one allotment in Maryland) is 5,166,786, in the sixteen States, their territories and dependencies. This large amount

* The population of Tennessee is estimated at 100,000, and that of the deficient district of Maryland at 10,000; which makes 5,276,786 for the whole population of the United States. In the year 1790 the whole population was only 3,929,326; making the increase for ten years 1,347,460.

indicates a most rapid increase of inhabitants, by natural increase and by immigration. It has not been correctly found what proportion of the augmentation since the last census is made up of the swarms from the hives of Europe, and what from domestic multiplication. But we derive various other information from it; such as,

1. *That within this national territory there are more male children born than females.* The number of free white male children, under ten years of age, is 739,678: that of free white female children, within the same age, is only 694,417: making a difference of 45,261 males more than females alive at the time of the numbering; a number equal to one-sixteenth more boys under that age than girls. Hence, in the United States, the male children exceed the females in number at the rate of about 17 to 16, amounting to a surplusage of no less than 1 in 17.

2. *That there is a much more rapid expenditure and consumption of masculine than of feminine life between the ages of 10 and 26.* For notwithstanding the large odds in favour of males at the age of ten, the proportions are reversed before the age of 26, and there is a difference in favour of the females. Between the ages of 16 and 26, there are of males but 383,104, and of females 391,473, making an overplus of females equal to 8369, or a preponderancy of numbers of that sex above the other in the proportion of about 1 in 47: whence it appears, that in the United States there die 53,630 more of males than of females between the ages of 10 and 26. Therefore, though more males are born and alive at the age 10 in the United States, yet, owing to accidents incidental to the male sex, to maritime, military, and other exposures, and to youthful indiscretion and intemperance, a much larger proportion suffer death before their arrival to the age of 26 than of females.

3. *Notwithstanding the greater mortality among males under the age of 26, yet from that age to 45, and beyond, there is an increased mortality among females.* The United States contain, of males of 45 years and upwards, 257,311; and of females of the like ages, 244,560; making a majority of the former equal to 12,751. This increased extinction of female life after 26 is probably to be ascribed to pregnancy, child-birth, and diseases peculiar to the softer sex: though in Connecticut, Rhode-Island, Massachusetts and New-Hampshire, owing to the emigration of the men from fulness of population, there is a considerable majority of elderly women.

4. *Of the 5,166,786 inhabitants, 874,777, or nearly a sixth, are SLAVES.* Maine, Massachusetts, Vermont, and the Territory North of the Ohio, contain *none* of this class of human beings; New-Hampshire only *eight*; Rhode-Island, Connecticut and Pennsylvania but *a small number*. The great body of these negro and mulatto slaves belong to Maryland, Virginia, the Carolinas, and Kentucky, in which States, taken collectively, they amount to almost *one-third* of the population. In Maryland, by itself, the slaves amount to more than *a third*, and in the eastern district of Virginia to *above half*, the number of inhabitants. In New-York, New-Jersey and Delaware, the number of slaves is by no means inconsiderable. In New-York they make about *one-twenty-seventh* part of the population; and, by virtue of the statute for the gradual abolition of slavery, the denomination will become extinct with the lives or bondage of those who, at the passing of that act, were slaves.

5. *The State of New-York (the total of whose inhabitants is 586,141), reckoned alone, the proportions of males and females alone, at different periods of life, are in a somewhat different ratio; there being a larger number of males through all ages.* Here, in this commonwealth, separately considered, the number of males under ten years is 99,995, and of females, is 95,136; making a difference of 4,859 more boys than girls; which is only an excess of 1 in 21, or a production of 20 girls to 21 boys. Of males between 16 and 26 years, this State contains 49,274, and of females between those two ages, 48,216; which is an unexpected difference of 1058, or of *one-forty-sixth* in favour of males. Here the predominancy of males continues through all the hazardous times of life, even to the 26th year. But the ratio alters. Below the age of 10 it was at the rate of 21 boys to 20 girls; after that age to 26, it is in the proportion of 47 boys to 46 girls. In New-York, therefore, there die, between the ages of 10 and 26, as many as 3901 young males more than females. There are several thousand more men alive at the age of 45, and beyond, than of women. The greater immigration of males than females into this commonwealth will explain these variations.

DECOMPOSITION OF WATER BY BOILING OIL.

It has commonly been thought, that when water was thrown into oil heated to the boiling point, it underwent expansion merely, and was converted into steam. And to this sudden

enlargement of liquid water by turning to elastic vapour, have the increased volume boiling over, and violent combustion of oil in such cases, been generally ascribed. It is, however, questionable whether this explanation is correct. Water, dropped into boiling oil, seems to undergo decomposition; its oxygen combining with the oil into a substance approaching to resin, and its phlogiston escaping in the form of inflammable air. This, at least, seems to have happened in the following handsome experiments of Mr. William Mayell, of New-York, communicated to Dr. Mitchill in a letter dated September 1, 1801.

“ Recollecting to have heard it said, that if water be thrown upon oil or turpentine when in a state of combustion, it will increase rather than extinguish the flame.—To ascertain the truth of this saying, I tried the following experiment:—I took a part of an oil flask, into which I put some linseed oil, and set the flask upon some red-hot coals, for the purpose of heating the oil. After the oil was heated to a less than boiling heat, I introduced some cold water by means of a small splinter of wood, which I first dipped in water, and then in the hot oil. A violent effervescence ensued. I repeated dipping the wetted splinter in the oil until its surface was covered with froth. I then held the flame of a candle over the oil, and, at the same time, immersed the wetted splinter in it. An explosion took place, but the flame did not attach itself to the oil. This I repeated several times, and each repetition was attended with an explosion.

“ That hydrogen gas was the cause of the explosions appeared to me evident; but whether it came from the water or the oil was rather doubtful with me; for, by analysing oil, M. Lavoisier found its constituent parts were hydrogen and carbon; yet it did not appear to me that the oil was decomposed, which must have been the case had the hydrogen gas obtained escaped from the oil. But that the hydrogen gas came from the *water* in consequence of *its* own proper decomposition, appeared very evident to me the next morning, when I found the oil in a congealed state, an effect which follows the combination of oxygen with oil: for, by means of the metallic oxyds which part freely with their oxygen, such as the oxyds of lead, oils are rendered drying, and approach to a resinous state.

“ I repeated the experiment a day or two afterwards, which was attended with the same result. I introduced flame to the froth which covered the surface of the oil. A small explo-

sion took place, and the froth or small bubbles instantly disappeared; from which I concluded that the escape of hydrogen gas was the cause of the effervescence. I afterwards used turpentine instead of oil, and observed the same effects to follow; but, upon sprinkling a little water upon it with my fingers, a sparkling took place very similar to that which attends the combustion of gunpowder a little wetted."

BENEFICIAL EFFECTS OF ALKALIES IN CONSUMPTION OF
THE LUNGS.

Dr. Lyman Spalding, of Portsmouth, New-Hampshire, has communicated the following case of phthisis pulmonalis, treated by alkalies, to Dr. Barker, of Portland (Maine), in a letter dated August 1, 1801:

"Last April I was desired to visit a woman who had all the symptoms of consumption; such as night-sweats, quick pulse, hectic paroxysms of fever, cough, pain in the side, loss of appetite, furred tongue, and great prostration of strength. Under these circumstances I did not promise much relief. By a plentiful use, however, of soda and lime-water, she now enjoys a tolerable share of health, quite free from hectic symptoms. I believe that *alkalies* are the best remedies yet known for consumptions. They certainly have a most happy effect in those complaints of the lungs. My common dose of soda is a tea-spoonful. In a nauseated stomach I have used this article with general relief, especially if the sickness be accompanied with heart-burn, which is not unfrequently the case."

Dr. Barker has related another remarkable case which occurred in his own practice, in his letter to Dr. Mitchill of August 4, 1801:

"A lady in Portland, aged twenty years, of a tall and slender make, was brought so low in consumption, in the winter of 1801, that she was unable to walk, and could set up only a few hours in the day. Her symptoms were impaired appetite, quick pulse, febrile paroxysms, occasional flushed cheeks, redness of the lips and tongue, sore mouth, pain in the sides, uneasy breathing, cough, and expectoration of matter, which was sometimes tinged with blood; great emaciation of body, night-sweats, &c. She began to complain in February, 1800; and the febrile paroxysms, which were preceded by chilly fits, commenced the following June. In the fall she had taken some foxglove. One quarter of a grain, however, excited vomiting, and induced great pros-

tration of strength, so that it was soon laid aside. After this some elixir of vitriol was taken, which was very offensive to the stomach. Tonic bitters were then substituted, but they evidently excited the fever.

"In this critical juncture, when her lungs were considered as being ulcerated, or otherwise incurably diseased, *alkalies* were recommended by her physicians. These were congenial, and taken with avidity. The consequence was, that her febrile and other complaints gradually abated, and her appetite mended.

"In June she was able to walk, and to ride in a carriage; and in July she took a journey into the country to visit her friends, with few complaints.

"Her confidence in *alkalies* was such, that she had them mixed with almost all her food, and took very little medicine of any other kind while using them, until the fever had subsided, when tonic bitters were conjoined to advantage.

"It appears that, since December last, she has taken, at least, a pound and a half of *sal. absynth*, and a quarter of a pound of *soda*, besides *aqua benedicta* and *creta*.

"Great attention was likewise paid to her nutriment, which consisted chiefly of oily and mucilaginous articles; as milk, and its preparations with Indian meal; jalap, jelly of calves feet, eggs, &c. With such kind of food she was fed in the *night* as well as in the day, agreeably to Dr. Rush's important advice respecting the administration of food in consumption, so that her stomach should not be empty even for a single hour; and her apartment was properly ventilated.

"The recovery of this patient, which was far beyond the expectation of every one who saw her, serves greatly to enhance the reputation of *alkalies* in a disease where we have reason to believe that a POISONOUS ACID is preying upon the delicate fibres, like a canker-worm upon tender foliage."

Dr. Barker has several very similar cases upon record, in which *alkalies* proved equally efficacious.

PESTILENCE IN THE UNITED STATES.

The summer and autumn of the present year have been generally favourable throughout the United States in respect of the malignant disease popularly called yellow fever. It has indeed made its appearance in several of our cities, and in some unhealthy districts of the country; but no where has it spread so far, or continued so long, as to produce the ravages ex-

perienced in many former years. As on all occasions heretofore, it began under the circumstances which usually generate the annual epidemic disorders of the summer and autumn, prevailing in hot climates, and was suddenly terminated by the coming on of sharp frost. The moderate state of the weather, in the months of July and August, in all probability, was the cause of the later appearance of the disease than common. From the beginning till the 10th of September the heat became violent and steady: about the middle of that month several instances of the disease were observed in this city, and they continued to appear, in greater or smaller number, till the beginning of November.

The cities of New-York, Norfolk (Virginia), and Charleston (South-Carolina), have suffered more, according to our present information, than any other places in the United States. The disease also appeared, and produced some mortality at New-Bedford (Massachusetts), and at Norwich (Connecticut). We likewise heard of prevailing sickness at Savannah (Georgia); but nothing more than common report has yet reached us relative to the latter place. The city of Philadelphia, we learn, has been generally healthful: some cases of malignant fever occurred in the western streets, but did not become so numerous as to excite much alarm.

In the city of New-York the disease commenced, as we before remarked, about the middle of September. About one hundred and forty persons died of it in the city from that period till the last of October; and about thirty persons, chiefly sea-faring men, vagrants, or people otherwise destitute of the means of providing for themselves in case of illness, were sent, within the same period, to the Marine Hospital on Staten-Island, labouring under the disease; of whom a considerable proportion also died. Notwithstanding this small amount of mortality, which did not exceed the rate of ordinary seasons, a great alarm was produced; many citizens left the town, especially those in the most exposed situations, and the course of mercantile business for several weeks was extremely impeded.

The disease chiefly attacked foreigners, or persons from the country; and in the few cases of its attacking natives and residents in the city, it might easily be traced to the effects of some violent exciting cause, such as cold, fatigue, intemperance, &c. It also chiefly invaded persons living in or frequenting certain spots of the town, which were remarkable

for accumulations of filth, for extensive portions of newly made ground, or for the indigence, crowdedness and uncleanness of the inhabitants.

On looking over a list of the deaths by this disease, and of the residence of the dead, which is laid before the public, it appears that a greater number died in East Rutger's-street than in any other of the city, although the whole number of the inhabitants of that street is comparatively small. The following account of that part of the town will explain this fact:

East Rutger's-street has been settled within a few years; and the houses are built upon a sandy soil, remarkable for the purity and wholesomeness of its water. Accordingly it has been much wondered that such a street should be sickly. Yet the reason is very evident to those who live in the neighbourhood, and know the local circumstances; and some of the neighbours predicted the sickness early in the season. There was in that street, on its east side, and a little to the northward of Lumber-street, an alley or recess, containing seven houses, remarkable for their moral and physical uncleanness. Some time in June the excrementitious matters collected in the houses, tenements and yards situated there, began to be offensive to the neighbours. Some complaints and expostulations were made with the occupants touching their removal. But it was soon discovered that neither the landlords nor the tenants would incur the expense of carrying away the poisonous nuisance of overflowing privies and corrupting offal. During the contention on this point the hot season came on; and, at last, application was made to the street-commissioners to procure the scouring of this alley by public authority. The neighbours, however, do not know that much was done, and more than half remained untouched. Things continued in that foul condition until more than common sickness began to appear among them in the month of September. The alley then had few steady inhabitants; for, in the course of the season, it became the last refuge of the wretched outcasts of some of the worst brothels in the city, and of some of the most needy and depraved European emigrants, who, exhausted with vice and disease, straggled into this pestilential and almost deserted place, remote from the public streets, to terminate their days. A considerable proportion of the deaths which happened there were of these vagrants, a majority of whom were females, turned out of doors by the bawds in whose houses they had formerly dwelt, and for whose infamous service they were no longer

fit. Thus the greater part of the mortality was among people whom none of the resident inhabitants were acquainted with, and who, on inquiry, were found to have been nearly exhausted by intoxication and lewdness before they came there. The scenes of human woe in this alley were diversified with a shocking variety of forms. From this place, as from a local centre, the atmosphere received a poisonous impregnation, and several of the steady and valuable inhabitants were thrown by it into yellow fever, and died with symptoms of great malignity. Yet remarkable it is, that the constitutions of two or three of the original inhabitants became so seasoned to this local atmosphere, that, refusing to quit, they remained there through the whole time, survived, though after several attacks, and are still alive.

The part which next presents the greatest number of victims is Front-street. This fatality was especially remarkable in that portion of Front and Water streets which lies between the Coffee-House-slip and the Fly-Market. It is well known that this part of the city consists entirely of made ground, and that it is underlaid and overspread with all that immense collection of nuisances which length of time and negligence of police could allow to be brought together.

The other parts of the town where the disease chiefly prevailed, when particularly examined, seem to afford full explanation of the local circumstances which led to the greater degree of mortality in them.

Although the comparative smallness of the number of deaths in this season compels us to consider the disease rather as sporadic than epidemic, we are under the necessity of admitting, that, in many cases, as much virulence and malignity appeared in the symptoms and rapid course of it as we ever observed in the epidemic of 1798.

As to the source of this malignant disorder, no reasonable doubt can exist of its domestic production. The incoherent accounts, whispered into the ears of the credulous and undiscerning, but never laid before the public in a specific form, of its originating among two or three sailors from Scotland or Ireland, are too absurd to stand in need of refutation. If it were even admitted that the disease first appeared among persons of that description, still it is incumbent on the importers and contagionists to trace all or most of the subsequent cases to a common centre or centres of human effluvia; a task so utterly hopeless and impossible, that we can venture to assert they will never undertake it. The proofs of non-

contagiousness have been this season so clear and impressive as to satisfy the great body of the citizens of New-York: The sick were scattered over all parts of the town; they were surrounded by physicians, nurses, relatives and friends; every kind and degree of exposure to the effluvia of the patient was continually experienced: yet, notwithstanding all this, no instances of the spreading of the disease by contagion are pretended to have happened. Most of the cases were single ones in the midst of families, many of which were numerous, and all exposed to the virulence of contagion, if any such had at all existed. And to crown the evidence on this point, and prove it to have been an *out-of-doors* poison, unconnected with effluvia from the sick, their clothes or bedding, it disappeared immediately after coming on of sharp frost.

We insert the following account of the yellow fever in New-Bedford, in Massachusetts, from a person living on the spot:

“A vessel arrived in that port from Demarara, some of whose crew had been affected with malignant fever while at Demarara, and one person died on her passage home. Within three or four days after her arrival, some of the persons who had been on board her were taken ill of the fever. Two young men belonging to a neighbouring town were of this number; and both died in three or four days. All who were seized lived near the spot where the vessel lay, which was at the foot of a dirty lane, a place not well ventilated. Eight or nine persons died, but the disease was not communicated, in any instance, from the sick by infection. The vessel contained a large quantity of damaged coffee—injured, it was supposed, to the amount of 85 per cent. of its value—owing to its being not well dried, and stowed on green wood in a close hold. The fever lasted but a few days, and was limited to a small compass near the vessel.

“There is, therefore, good reason to believe the fever to have been engendered by the morbid effluvia from that vessel; but the town of New-Bedford being small, and situated on a dry, rocky acclivity, and containing a good air, the disease did not spread beyond the atmosphere which had been vitiated by the effluvia.”

Here is, then, another striking instance of the virus of yellow fever, generated in a vessel, infecting such as went on board or approached within a small distance of it, but, like the poison of carbonic acid gas, not communicable at second hand to persons placed beyond the range of vitiated air.

A few persons have died also at the port of Norwich, in Connecticut, with a disease which is agreed to have been the true yellow fever; but the inhabitants on the spot could trace it to no arrival from abroad.

Concerning Norfolk, in Virginia, we have heard little more than common report. The following certificate of the cessation and non-contagiousness of the yellow fever, under the signature of four of the most eminent physicians in that city, has been published in the newspapers:

“*Norfolk, Oct. 12, 1801.*”

“We do certify, that the malignant yellow fever, which prevailed with violence for some time past, has now nearly ceased; and that the health of the town appears to be improving daily. We know of no instances in which the disease has been communicated by contagion.

“SELDEN & WHITEHEAD,
“TAYLOR & HANSFORD.”

From Charleston, in South-Carolina, our intelligence is also, as yet, very imperfect. It has been stated that, in the present as in former years, the yellow fever in that city has been chiefly confined to strangers from the higher latitudes and from the country; and that the natives and old residents, in conformity to constant experience in the West-Indies, were seldom affected by that poison.

We hope to obtain, for a future number, a more particular account of the disease, as it appeared at Norfolk and Charleston, from our learned correspondents in those cities.

A Case of Black-vomiting in an Emigrant newly arrived from Scotland, with Remarks on the Diseases of Emigrants. In a Letter from Mr. Quackenbos, of the New-York Hospital, to Dr. Mitchill, dated Sept. 14, 1801.

SIR,

As it has been a subject of much controversy among physicians, whether the American autumnal fever be of domestic origin, or imported from foreign countries, I take the liberty of relating a few facts relative to emigrants from North-Britain, which have lately come to my knowledge, and which I think are worthy of the attention of the learned Professors of Medicine in the Universities of Edinburgh and Glasgow.

September 10.—Admitted into the New-York Hospital, James Tough (a Scotchman), aged 21 years, with all the symptoms of fever. He arrived in this port on the 1st inst. from Leith, in the brig Rambler, Capt. G. Norris; forty-nine days passage. Enjoyed perfect health during the whole of the voyage; and, immediately on his arrival, took lodgings in Front-street, corner of Pine-street, where he remained well till the 9th; when, on his way to the farm of a person in whose service he had engaged himself as gardener, he was seized with pain in the head, back and loins. On the eve of the day following was removed to the Hospital, when, on inquiry, I found that he had taken no medicine, but had vomited a considerable quantity of fluid mixed with bile, a few hours previous to his admission. His pains still continued severe. Pulse 100, and somewhat tense—skin hot and dry—tongue furred—countenance flushed—belly costive.

The attending physician being absent, I prescribed the following medicine to be taken immediately.

R. Calom. ppt. gr. x.

Pulv. Eccoprot. 3 ss. M.

11th. Nine o'clock A. M.—The powder both purged and puked him. His stools were very fetid, and tinctured with gall. Sumat. qq. hora Spts. Minder. coch. magn. ij.

One o'clock P. M.—Vomits, at the present moment, a dark coloured matter. Omit the Spiritus Mindereri. Let him take one ounce of yeast every half hour.

Nine o'clock P. M.—Vomiting still continues, which very much resembles the grounds of coffee. His intellectual faculties appear somewhat disordered. Pain in the head still very severe. Applicet. statim Empl. Epispast. Nuchæ. Complains also of pain in the stomach.

12th. Eight o'clock A. M.—Moribund.

On further inquiry, I was informed that three other men, viz. John Guthrie, Alexander Guylon, and James Cleat, all of whom belonged to the above-mentioned brig, which then lay at a wharf on the east side of the city, were taken sick on the 10th, and were, by order of the Resident Physician, immediately removed to the Marine Hospital on Staten-Island. I was also told that no disease had appeared on board said brig during the whole voyage till her arrival.

At the time of her arrival, the Rambler and her crew were healthy: the city of New-York and its inhabitants, too, were remarkably healthy: and yet here are four decided cases of fever, particularly that of James Tough, without their hav-

ing had any connection, either directly or indirectly, with sick persons here, or with any person or thing of the same kind from the West-Indies, or even Ireland. (See Med. Rep. vol. v. p. 69.)

As these cases have existed, they must have had an origin. Let, then, the strenuous advocates of importation find it out. You will readily discern that a little carelessness, or a little design in telling the story, would make this an instance of importation from Scotland, according to the hypothesis of its being contagious, as plain as the importation of a contagious fever from Boullam to Grenada. But we trust we know better. In these, and similar cases, the exciting cause of the distemper is not in the ship, perhaps not in the city, but in the stomach and intestines of the emigrants, over-charged, as usual after a voyage, with animal food. Here, as in the West-Indies, the food, drink, and way of life which many emigrants indulge, destroy their health and their lives, by exhausting their excitability, and over-charging their living solids with septon; and then the survivors, philosophers as well as the vulgar, most unreasonably throw the blame upon the climate. The alimentary canal is also often disordered by the beef and distilled spirits taken into it, and the rest of the constitution suffers by association of morbid motions and feelings: and indeed it may be thought that a pestilential quality of our atmosphere, too small to affect our natives, could nevertheless operate powerfully upon new-comers and strangers.

Yours with great respect,

NICHOLAS I. QUACKENBOS.

Apothecary of the New-York Hospital.

INTELLIGENCE FROM DR. CHISHOLM SINCE THE PUBLICATION OF THE SECOND EDITION OF HIS WORK ON FEVER.

The celebrated Dr. Chisholm, whose book on the Grenada distemper contains a more full picture of contagion in the West-Indies than any other modern publication, has apparently led some of his readers into a mistake, as respects his own doctrine. He by no means contends that the yellow fever of the West-Indies arises from contagion; but his opinion seems to be, that contagion generated on board the ship Hankey, in 1793, spread by contagion over many of the islands, and much of the continent of North-America, exciting a specific form of disease not known in any of those regions before.

Since the manuscript of this candid and observing physi-

cian's second edition of his work was sent to London to be printed under the eye of Dr. Rollo, a severe sickness broke out in Demarara (August, 1800), where Dr. Chisholm then resided on his rich and productive cotton plantation. The place where it raged was Stabröek, and he describes it as follows:

"A fever of a most alarming nature has most fatally prevailed since the beginning of July. I have visited a few of the sick at the request of Doctors Dunkin and Lloyd in town, and of Dr. Ord on this coast; and I have no hesitation in pronouncing it a fever of infection. Its features are, almost without exception, precisely those of the malignant pestilential fever of Grenada of 1793 and 1794. It is fully as fatal, as rapid, and as insidious. Its origin, as far as it has been ascertained by the gentlemen I have mentioned, seems to be similar. A ship arrived about the beginning of July or end of June from Liverpool, after touching at Surinam. The filth on board, occasioned by a cargo of horses, and the extreme neglect of the officers and crew, was such as beggars description. Infection was the consequence. Her officers and crew were the first sufferers: every man died. All who went on board were attacked, within thirty hours after, with a fever of infection. All who visited the sick, particularly those unassimilated to the climate, have had the same fever. Many white persons, attached to plantations on this coast, whose business led them to town, and to infected houses, received the infection, and had the fever immediately after their return to the country. Of these, as I have already said, scarce one-third, or perhaps one-fourth, have recovered. The cause, I fear, has been neglect in most instances; in many, no doubt, the insidious nature of the disease; and, above all, an unwillingness or fear to make use *instantly* of cold water bathing and calomel, has rendered the fever fatal. A proof of this is the observation of Dr. Dunkin, that those few who became early salivated have been the only survivors. I have endeavoured to impress all the medical gentlemen of my acquaintance with the necessity of the earliest possible use of the two remedies I have mentioned. Pregnancy, under the morbid action of this fever, has uniformly terminated in abortion and death. In some instances whole families (males) have been swept away by it. What a lesson this is to masters of ships! How clearly it exhibits the necessity of exertion on their part to maintain cleanliness on board their ships! And

how evidently does it display their responsibility to the public for the consequences of misconduct!

"I have directed the use of the cold bath in some instances of extreme debility consequent upon fever; and in every one it has proved useful, and in many has saved the patient's life. The effect, however, of the remedy in these instances, and in all similar ones of extreme febrile debility, requires explanation; for, on the received principles, it certainly cannot be accounted for. When the vital powers are prostrate—when the mental faculties are altogether deranged—when, in short, there is no other prospect but approaching dissolution—the sudden affusion of water of 78 deg. gives energy to the former, and collects the latter. But mark the temperature of the patient's body before and after the application of the water, and the state of the pulse. We shall, no doubt, look for an augmentation of animal heat, and an increased celerity of pulse. But the contrary is the fact. I shall mention one instance only. I was not requested to see this patient till the state I have mentioned came on. His powers had been greatly impaired by long residence in the West-Indies, and excessive indulgence in the famous maxim of Ovid—"*Vina parant animos veneri.*" Nature, unaided, sunk under the debilitating influence of infection. Nothing remained but to endeavour to renew her powers; but, alas! it was too late. What cold bathing would have done, however, exhibited at an earlier period, was proved. The following are the results of the many trials made. It was employed every two hours for the last two days of his life.—July 18. Before the application, nearly insensible—heat 100, pulse 100. After—much muscular energy, and perfect mental collection: heat 95, pulse 92.—19th. Before—general state as yesterday: heat 99, pulse 100. After—the same evident effect: heat 92, pulse 96. In this instance four buckets of water were used instead of two.—With two buckets: Before—heat 99, pulse 100. After—heat 95, pulse 100.—20th. About an hour before death—heat 94, pulse 98. After—heat 94, pulse 96. Whilst moribundus, heat at the armpit 98, pulse 120: at the wrist, heat 94: at the foot, heat 88. In articulo mortis, heat at the wrist 90: at præcordia, heat 100—no pulse.—In the case of one of the most respectable merchants in Stabröck, some time ago, when no infection existed (the case being yellow remittent fever, and the state of the patient extreme debility, &c.), at my instance cold affu-

sion was recurred to, with the plentiful exhibition of spiced wine, and mercurials. The event was pleasing: His faculties became perfectly collected; his vital powers improved; and his own sensations, after each affusion, were such as to induce to beg earnestly for a repetition of, and to long for it. He recovered perfectly; and, beyond all doubt, owed his life to these excellent remedies.—I am happy to find your experience, and that of all the well-informed medical practitioners of your acquaintance, tend to confirm the wonderful efficacy of them. I had a letter from Mr. Christie, dated off Surinam, stating his success on board the Hydra with them. —Like most other medical men, I felt rather timid when I began the mercurial practice in the malignant pestilential fever, having no precedent experience to encourage me in it; and, of course, many died under it: but when I became bold in the use of mercury, and gave it freely, my success confirmed the utility of it, and I have never deviated a moment from it since.”

The following further extract of this letter to Dr. Davidson, of Martinique, on this subject, exhibits a spirit of composition and accommodation very honourable to the writer, and well worthy the imitation of all the contagionists. We do not mean that they shall declare that hydro-carbonate is an exciting cause of fever, but that they should, like him, allow that there is another exciting cause than contagion. And this, in our judgment, is about the same with giving up the argument.

“There is a circumstance in the fever,” so Dr. Chisholm ingenuously writes in his letter dated Demarara, August 10, 1800, “I have given you a general account of, rather singular. The heat has never exceeded 100 deg. as Dr. Dunkin tells me; and the affusion of cold water, of the temperature of 78, has seldom given pleasure; but where it has, the effect has been wonderfully agreeable. In further conversation with Dr. Dunkin, I find that there has been room for conceiving that the fever, in general, was of a mixed nature; that is, that it partook of contagion and miasm—the former giving origin to it, and the latter, in the greater number of cases, giving it the remittent form, and diminishing the tendency of contagion to emanate and assimilate. I know it is almost an axiom in medicine, that two causes cannot act at the same time on the human system, so as to produce a disease partaking of the nature of each: but I suspect it has been adopted without sufficient investigation; for why may not

hybridous diseases exist as well as hybridous animals and plants? Sure I am, the accounts of many medical writers cannot be reconciled without the admission of such. In the present instance, Mitchill's gaseous oxyd of azote (septic acid vapour), proceeding from the decomposition of animal matter, particularly the urine of horses (and the excretions of men, he might have added), produced, at first, a disease of a pure pestilential nature. It afterwards formed a combination with the hydro-carbonate of the trenches, and the combination gave existence to a disease of a malignant remittent nature. From this arise, probably, the low temperature of the body—the consequent dislike to the application of cold—the excessive debility which constantly followed depletion, particularly bleeding at any period of the disease, and however constituted the patient might be. This disease has afforded an additional proof of the inefficacy of bark, and of the injury which may follow the exhibition of it. In no case was it useful, and in every one it excited or augmented gastric irritation. Taking a view of all the circumstances, we clearly see the necessity for the adoption of what may be called qualified antiphlogistics, the action of which will render that of all others unnecessary; for, remove the proximate cause, which is an inflammatory diathesis of a peculiar nature, and you remove the disease."

On comparing the tenor of this letter with what appears in Dr. Chisholm's published writings, we are happy to find much less variance between his opinions concerning malignant diseases and our own, than we formerly supposed to exist. The Doctor strenuously maintains, in his "Essay on the Malignant Pestilential Fever which prevailed at Grenada in 1793 and 1794," that the yellow fever of the West-Indies is an *endemic disease, arising from the miasmata of putrefaction, and not contagious*. In the case of the supposed introduction of the malignant pestilential fever, by the ship Hankey, into the island of Grenada in 1793, he believed the fever, so introduced, to have been *generated on board of the ship*, and not to have been derived from Boullam, or any other part of Africa. In this account, likewise, of the supposed importation of a malignant disease into Demarara, he evidently holds forth the opinion of its originating in the ship, *from the decomposition of animal matter, particularly the urine of horses*. Nothing is said or hinted of the infection having been received at Surinam, where the ship touched on her voyage; and few, we suppose, would undertake to trace it to Liver-

pool, or any other part of Great-Britain. We are glad to observe that Dr. Chisholm is not so unreasonable as to believe that the yellow fever of the West-Indies may be caught like the small-pox, by seamen navigating vessels to these islands, and, through the medium of their persons, clothing, or bedding, be transported to the continent of America. His good sense and experience had taught him, that the opinion of the inhabitants of the West-Indies, that yellow fever is one of the native products of their islands, destitute of contagion, and consequently incapable of exportation or importation, is strictly true. It gives us pleasure and confidence to find such an auxiliary as Dr. Chisholm in the support of this important fact.

But in two points we dissent from Dr. Chisholm: 1st. In his opinion of the *peculiar nature* of the pestilential disease which appeared in Grenada and Demarara, and of its differing essentially from the yellow fever as it prevails in the West-Indies, and on the American continent. And, 2dly. In his opinion of the contagiousness of the pestilential disease generated on board of ships, while he justly acknowledges that the yellow fever is not capable of being propagated by such means.

It would be unnecessary here to reiterate the arguments so often employed to prove that a malignant fever, generated on board of a filthy or crowded vessel, is precisely similar to such a disease generated on land where filth is accumulated, or a number of inhabitants crowded into small, uncleaned and unventilated houses. If the latter circumstances of crowded dwellings, without cleanliness or ventilation, take place in a cool climate, or in a cool season of the year, the generation of typhus may be expected to be the consequence, as is continually happening in Great-Britain, and in other countries similarly circumstanced; whereas, if great accumulations of filth be suffered to be formed in ships, houses, or in towns, and, at the same time, be acted upon by high atmospheric heat, yellow fever may justly be dreaded as the consequence, agreeably to the experience of the West-Indies, and of many parts of the American continent, especially in those seasons, or in those situations, where morbid constitutions of the atmosphere are, by their effects, known to prevail.

As to the contagiousness of this ship, house, city or marsh fever, we have recently, as well as formerly, had so much pointed and repeated experience in this country, and so often laid the results of this experience before our readers, that we shall not,

at present, fatigue them with a reiteration of the facts. Ships, in which the poison of putrefaction had been generated to the most virulent degree, have, indeed, often entered our ports and harbours in the United States, and destroyed the lives of multitudes of our citizens, who went on board, or too nearly approached them. But after listening to much vague report and much positive assertion, always discovered to have been misrepresented when duly traced, we have never met with a single authentic instance of the spreading of such diseases by contagion. And as to the mixed or hybrid forms of malignant fever, concerning which Dr. Chisholm offers his conjectures, we can only observe that they appear to us to be founded upon an analogy too remote and fanciful to serve as the basis of sound or correct reasoning.

ANOTHER INSTANCE OF PESTILENCE ENGENDERED IN A
SHIP CROWDED WITH PASSENGERS FROM IRELAND.

The ship *Nancy*, Capt. John Herron, was chartered by a commercial house at Sligo, to carry passengers from that port to New-York. She sailed from Sligo on the 12th July, 1801, and arrived, after a passage of 77 days, at the port of New-York, on the 27th of September following. This ship, of the burthen of 202 tons, received on board 417 passengers, and was navigated by nine seamen. The provisions, mere refuse, put up by government-contractors with the view of saving expense, were of the worst kind; and the water, which was also of bad quality, from the unexpected length of the voyage, became extremely scanty before the arrival of the ship.

In order to receive so great a number of passengers on board of this ship, temporary cabbins were built on the quarter-deck, which were filled with eighty persons. Three hundred were crowded into the space between decks.

It will excite no surprise that a vessel thus crowded became sickly soon after sailing from Sligo. Typhous fever and dysentery soon began to prevail, and destroyed the lives of a large proportion of the passengers.

In addition to the wretchedness of being confined in such numbers in so small a space, these unhappy emigrants suffered all the evils which their habits of uncleanness could produce. Their bodies and clothes, covered and saturated with filth, exhaled poison all around them. Partly from the want of strength and assistance among the sick, and partly from the want of a sense of decency, the space between decks, occupied by nearly 300 persons, became the receptacle of all

excremental matters, insomuch that they issued in streams from the scuppers. The filth on the upper deck was nearly over the shoes. The sides of the ship were daubed and incrustated with excrements; and even the ropes for the support of such as wished to go on board were unfit to be handled. The stench was intolerably offensive.

In such condition arrived this unfortunate vessel at the place assigned for quarantine in the port of New-York. Ninety persons had died on the passage; one hundred and eighty were sick. Scarcely a healthy countenance was to be seen on board of the ship; very few had escaped disease; and many had suffered from three to four relapses. About forty were taken ill after their arrival.

As soon as possible after their arrival the sick were brought ashore; stripped of their filthy and pestilential clothes; their bodies thoroughly washed and scoured with soap and water; and then wrapped up in clean blankets, and carried into the wards appointed for their reception in the Marine Hospital. The permanent buildings of the establishment were insufficient to receive so great a number; tents, and other temporary accommodations, were provided for the remainder. Separation, ventilation and cleanliness, as soon as they could be brought into action, accomplished every thing that could be expected. And only twenty-six have died since their arrival at this port.

PROGRESS OF THE COW-POX IN AMERICA AND EUROPE.

The Rev. Mr. DUBY, in a letter to Dr. Mitchill, dated Geneva, in Switzerland, June 12, 1801, mentions that the vaccine disease had been quite established there for above a year. And from Citizen COLON's *Histoire de l'Introduction et des Progres de la Vaccine en France*, Paris, 1801, which lately reached us, we learn that it has made great progress in France, notwithstanding the firm opposition it met with, and is proved "to be attended with the same advantages as the inoculated small-pox, but without its disadvantages." (p. 260). On the subject of the disease, Professor Waterhouse has written thus to Dr. Mitchill, in a letter dated Cambridge, Sept. 26, 1801.

"President Jefferson informs me that the kine-pox has pervaded, or is pervading, his family at Monticello, more than twenty having already gone through the *genuine* disease—at least I presume so from the virus sent him, and the description he has given me of its effects. It is progressing in this quarter with

undeviating success, *very few* spurious cases having occurred this season.

"Yesterday I received a letter from Dr. Jenner, one paragraph of which I must transcribe, because it contains the *golden rule of vaccination*, viz.

'I don't care what British laws the Americans discard, so that they stick to this—*Never to take the virus from a vaccine pustule, for the purpose of inoculation after the efflorescence is formed around it.* I wish this efflorescence to be considered as a sacred boundary over which the lancet should never pass.'

"Dr. Jenner sent me also a few pages of a work not yet published. In it he says the distrust and scepticism which naturally arose in the minds of medical men, on my first announcing so unexpected a discovery, has now nearly disappeared. 'An *hundred thousand* persons, upon the smallest computation, have been inoculated in these realms. The numbers who have partaken of its benefits throughout Europe and other parts of the globe are incalculable; and it now becomes too manifest to admit of controversy, that the annihilation of the small-pox, the most dreadful scourge of the human species, must be the final result of this practice.'

A REPORT ON THE VACCINE OR KINE-POX INOCULATION
IN NEW-YORK: COMMUNICATED BY VALENTINE SEAMAN, M. D.

"With infection fresh from the arm of Governor Sergeant's domestic, who had been inoculated in Boston by Dr. Waterhouse, and who arrived here on 22d of 5th month (May), in due season for his pustule to contain active matter, I succeeded in vaccinating a number of persons, in this city. The complaint (altogether different from that festering scab induced by the spurious matter received in the winter) commencing with a slightly inflamed spot, gradually increased to a circular pustule, elevated at its edges and depressed in the centre, containing a transparent watery fluid, slowly oozing out at punctures made into it, and finally terminating in a hard dark-coloured scab; all, *through the various stages*, so exactly corresponding with the accurate descriptions and delineations given by the most attentive writers—left no doubt on my mind of its being the *genuine* vaccine disease.

"To crown the experiment, however, not only for my own satisfaction, but also for the satisfaction of those more per-

sonally concerned, I afterwards inoculated several of them for the small-pox: viz. Capt. J. O'Brian's babe, boy and black girl, on the 23d of the last month, fifteen days after they had had the kine-pox inserted, were inoculated, by a double incision, with the most active small-pox matter, fresh taken from a person then labouring under that disease in the natural way; neither of whom was any way affected thereby, further than having a slight irritation upon the part, which disappeared in the course of six or seven days. After ten days they were all inoculated over again with active small-pox matter, with a like result. A fourth one, upon whom the *proving* experiment has been made, is a servant-woman of Jacob Wood, in Pearl-street. She was inoculated, on the 7th of this month, with active virus still fluid from the pustule of a person who had a great load of the small-pox: this was the sixteenth day after her vaccine inoculation. She has not since, and now it is twenty-three days, felt any effect but a little tumid redness upon the part, which disappeared in less than a week. Her son, of about seven years of age, who had been inoculated for the kine-pox fourteen days before, was also inoculated for the small-pox on the 11th of the present month, but to no effect.—I have, in all, inoculated eighteen with the infection derived from the source above-mentioned.

“This disease (if a disease it may be called), as far as has come within my observation, has been of an extremely mild nature. In not a single instance, in children, has there appeared to be the least general indisposition induced, nor in grown persons has there been so much as in the least to interrupt them in their usual occupations. Not one has had any eruption whatever excepting at the incision.

“When we consider how generally a spurious matter has been disseminated, and that we ourselves were most unluckily imposed upon with it, and by what a peculiar concurrence of circumstances the genuine infection was finally obtained, we cannot, I think, let it die with indifference, particularly before it shall undergo a more thorough trial. Whether infection be lost or not, this one consolation remains with me, that I have at least done justice to my own child, by having implanted it in him; and I feel a full compensation for all my trouble in this business, in the well-grounded belief of having thereby secured him from the influence of a disease which, even in the present improved manner of communicating it, is always dreaded—not unfrequently extremely

painful and distressing—sometimes ruinous to the constitution—and, at other times, more immediately fatal.”

RUSH'S INTRODUCTORY LECTURES.

Messrs. John Conrad & Co. of Philadelphia, have just published, “Six Introductory Lectures to Courses of Lectures upon the Institutes and Practice of Medicine, delivered in the University of Pennsylvania, by Benjamin Rush, M. D. Professor of Medicine in the said University.”

NEW MEDICAL WORK.

Messrs. Conrad & Co. have also in the press a new and original work on the following subjects: I. A specimen of physical geography, comprehending an investigation of the physical causes of heat and cold in various countries, and their alternate effects on the human body, from change of climate or seasons of the year. II. Sketches of medical topography, the causes of various local impregnations of the atmosphere from marsh miasmata, infectious effluvia, &c. III. The experimental philosophy of human life, of diseases, and remedies, applied to the healing art. IV. An analysis of modern medical surgery. V. The physical causes, the nature and treatment of the diseases most prevalent in warm climates and autumnal seasons. 1. Bilious affections and diseases of the liver, as obstructions and inflammations, and their consequences—abscess, scirrhus, dropsy and hypochondria. 2. Diseases of the first passages, as choleras, diarrhoeas and dysenteries—their natures and remedies, &c. 3. Fevers, such as intermittents and remittents, and their varieties; and continued fevers, as the typhus, or low nervous fever, and the pestilential or yellow fever.—By William Barnwell, M. D. formerly surgeon in the employ of the Hon. East-India Company of London, and now of Philadelphia.

In order to render the work more generally useful to gentlemen going to warm climates, or those who reside in the country, terms of art have been studiously avoided or explained.

The work will be printed on fine wove paper, and a good pica type. It is expected to consist of about four or five hundred pages, at two dollars in boards, or two and a half bound, to be paid on delivery of the book. The work is now in the press, and expected to be finished about the middle of December.

NEW MEDICAL AND SURGICAL SCHOOL.

We are pleased to hear that overtures are now on foot, and with a fair prospect of success, for converting the public Alms-house of the city of Philadelphia into a school for *medical* and *surgical* instruction. The number and variety of interesting cases which this institution constantly affords, gives it as great advantages in these points of view, as any other place in the United States. The conducting of the principal part of the medical and surgical business is likely to devolve on Dr. Physic and Dr. Caldwell.

FOREIGN.

ORIGIN OF THE VACCINE INOCULATION.

THE most important discoveries, when familiarized to the mind, are contemplated with indifference. Who now wonders at the discovery of America, or the circulation of the blood? There is, however, a period between the conception of a discovery and its mature birth, fraught with more pangs than war or women know; and there is no light in which the human mind can be viewed more interesting than during this anxious period. Whenever, therefore, the author of any greatly useful invention details the progress of his own mind during the completion of his plan, the history is perused with avidity. On these grounds we conclude that our readers will be much gratified by the following narrative:

"I am induced to give the following concise history of the origin of vaccine inoculation, from my frequently observing that those who only consider the subject cursorily, confound the casual cow-pox with the disease when excited by inoculation.

EDWARD JENNER.

"My inquiry into the nature of the cow-pox commenced upwards of twenty-five years ago. My attention to this singular disease was first excited by observing that, among those whom, in the country, I was frequently called upon to inoculate, many resisted every effort to give them the small-pox. These patients, I found, had undergone a disease they called the cow-pox, contracted by milking cows affected with a pe-

cular eruption on their teats. On inquiry, it appeared that it had been known among the dairies time immemorial, and that a vague opinion prevailed that it was a preventive of the small-pox. This opinion I found was, comparatively, new among them; for all the older farmers declared they had no such idea in their early days—a circumstance that seemed easily to be accounted for, from my knowing that the common people were very rarely inoculated for the small-pox; till that practice was rendered general by the improved method introduced by the Suttons; so that the working people in the dairies were seldom put to the test of the preventive powers of the cow-pox.

“ In the course of the investigation of this subject, which, like all others of a complex and intricate nature, presented many difficulties, I found that some of those *who seemed to have undergone the cow-pox*, nevertheless, on inoculation with the small-pox, felt its influence just the same as if no disease had been communicated to them from the cow. This occurrence led me to inquire among the medical practitioners in the country around me, who all agreed in this sentiment, that the cow-pox was not to be relied upon as a certain preventive of the small-pox. This for a while damped, but did not extinguish my ardour; for, as I proceeded, I had the satisfaction to learn that the cow was subject to some varieties of spontaneous eruptions upon her teats; that they were all capable of communicating sores to the hands of the milkers; and that whatever sore was derived from the animal, was called in the dairy the cow-pox. Thus I surmounted a great obstacle, and, in consequence, was led to form a distinction between these diseases, one of which only I have denominated the *true*, the others the *spurious* cow-pox, as they possess no specific power over the constitution. This impediment to my progress was not long removed, before another, of far greater magnitude in its appearance, started up. There were not wanting instances to prove, that when the true cow-pox broke out among the cattle at a dairy, a person who had milked an infected animal, and had thereby apparently gone through the disease in common with others, was liable to receive the small-pox afterwards. This, like the former obstacle, gave a painful check to my fond and aspiring hopes: but, reflecting that the operations of nature are generally uniform, and that it was not probable the human constitution (having undergone the cow-pox) should in some instances be perfectly shielded from the small-pox, and in many others re-

main unprotected, I resumed my labours with redoubled ardour. The result was fortunate; for I now discovered that the virus of cow-pox was liable to undergo progressive changes, from the same causes precisely as that of small-pox; and that, when it was applied to the human skin in its degenerated state, it would produce the ulcerative effects in as great a degree as when it was not decomposed, and sometimes far greater; but having lost *its specific properties*, it was incapable of producing that change upon the human frame which is requisite to render it unsusceptible of the variolous contagion: so that it became evident a person might milk a cow one day, and having caught the disease, be for ever secure; while another person, milking the same cow the next day, might feel the influence of the virus in such a way as to produce a sore or sores, and, in consequence of this, might experience an indisposition to a considerable extent; yet, as has been observed, the specific quality being lost, the constitution would receive no peculiar impression.

“Here the close analogy between the virus of small-pox and of cow-pox becomes remarkably conspicuous; since the former, when taken from a recent pustule, and immediately used, gives the perfect small-pox to the person on whom it is inoculated; but, when taken in a far advanced stage of the disease, or when (although taken early), previously to its insertion, it be exposed to such agents as, according to the established laws of nature, cause its decomposition, it can no longer be relied on as effectual. This observation will fully explain the source of those errors which have been committed by many inoculators of the cow-pox. Conceiving the whole process to be so extremely simple as not to admit of a mistake, they have been heedless about the state of the vaccine virus; and finding it limpid, as part of it will be, even in an advanced stage of the pustule, when the greater portion has been converted into a scab, they have felt an improper confidence, and sometimes mistaken a spurious pustule, which the vaccine fluid in this state is capable of exciting, for that which possesses the perfect character.

“During the investigation of the casual cow-pox, I was struck with the idea that it might be practicable to propagate the disease by inoculation, after the manner of the small-pox, first from the cow, and, finally, from one human being to another. I anxiously waited some time for an opportunity of putting this theory to the test. At length the period arrived. The first experiment was made upon a lad of the

name of Phipps, in whose arm a little vaccine virus was inserted, taken from the hand of a young woman who had been accidentally infected by a cow. Notwithstanding the resemblance which the pustule, thus excited on the boy's arm, bore to variolous inoculation, yet, as the indisposition attending it was barely perceptible, I could scarcely persuade myself the patient was secure from the small-pox. However, on his being inoculated some months afterwards, it proved that he was secure. This case inspired me with confidence; and as soon as I could again furnish myself with virus from the cow, I made an arrangement for a series of inoculations. A number of children were inoculated in succession, one from the other; and, after several months had elapsed, they were exposed to the infection of the small-pox—some by inoculation, others by variolous effluvia, and some in both ways; but they all resisted it. The result of these trials gradually led me into a wider field of experiment, which I went over not only with great attention, but with painful solicitude. This became universally known through a treatise published in June, 1798. The result of my further experience was also brought forward in subsequent publications in the two succeeding years, 1799 and 1800. The distrust and scepticism which naturally arose in the minds of medical men, on my first announcing so unexpected a discovery, has now nearly disappeared. Many hundreds of them, from actual experience, have given their attestations that the inoculated cow-pox proves a perfect security against the small-pox; and I shall probably be within compass if I say thousands are ready to follow their example; for the scope that this inoculation has now taken is immense. An hundred thousand persons, upon the smallest computation, have been inoculated in these realms. The numbers who have partaken of its benefits throughout Europe, and other parts of the globe, are incalculable; and it now becomes too manifest to admit of controversy, that the annihilation of the small-pox, the most dreadful scourge of the human species, must be the final result of this practice."

[*Med. and Phys. Journal.*

NEW REMEDY FOR THE STONE.

A surgeon of Madrid has been able to dissolve camphor in water by means of the carbonic acid. This camphorated solution, injected into the urethra of persons afflicted with the stone, allays the pain almost instantaneously.

[*Philos. Mag. for Dec. 1800, p. 291.*

APPENDIX.

ARTICLE I.

THOUGHTS on QUARANTINES and LAZARETTOS: *Addressed to RICHARD BAYLEY, Esq. Health-Officer of the Port of New-York, by Dr. MITCHILL, in a Letter dated July 7, 1801.*

REGULATIONS for preserving the health of men against foreign contagions make so considerable a part of the code of several European nations, that it is very interesting to know in what state of society, and under what circumstances, they arose, that we may thereby the better judge of their value and usefulness. It will appear, on investigation, that they were originally adopted before the principles of science on which they depend had been unfolded, and in times of fanaticism and terror, when the human mind was not in a condition to judge calmly about them, if they had been unfolded.

These regulations refer to three great objects: 1. Quarantines: 2. Lazarettoes: and, 3. Areas and stores for unladed goods and merchandize. On examining the history and actual condition of each of these, it will be found that in most cases they are instrumental in engendering and perpetuating that pestilence which it is their professed object to avoid. They all take it for granted that malignant and pestilential diseases are contagious—a supposition utterly groundless; and then undertake, with vast parade, to prevent the importation of this imaginary contagion. But a concise review of their history will set these establishments in the clearest light.

A quarantine, from “quarante,” the French word for “forty,” in its simple sense, means a duration of “forty” days. As a term of the common law, it means the time a widow is permitted to remain in the mansion-house of her deceased husband, and this is called her “quarantine.” This was a reasonable regulation, that the widow might not be turned out of doors immediately by the heir; but, after funeral rites were performed, might be allowed time to make deliberate arrangements for removal, and to receive an assignment of dower.

But what could have been the reason of fixing upon "forty" days for the detention of ships suspected to be already too dirty to live in, and, consequently, to be admitted into port? The direction of plain sound judgment, in such cases, would be to hoist out the cargo as fast as possible at some convenient station, rather remote from thick population, and to remove the nuisances, corruption and poison engendered on board with all speed. The mode of removing these, and of cleaning and sweetening a room so as to make it habitable and healthy, is so perfectly and practically understood, that scarcely a washer-woman or a chambermaid is ignorant that *lime*, *alkaline leys* and *soaps*, will destroy every particle of infection there. And as the pestilential poison could be thus destroyed in a *habitation on shore*, there can be no possible reason to doubt their efficacy in destroying it on board a ship, which is but a *human habitation afloat*. But it has been the misfortune of American and English navigators to adopt a mode of cleansing ships different from the method of cleaning houses; and great sickness and mortality have been the consequence.

Christendom is beyond a doubt the most intelligent portion of the globe. How, then, came the Christians, I say, to fix upon "forty" days as the expiatory period? It proceeded, probably, from a religious or superstitious veneration for the number "forty:" for "forty" is a very remarkable number, as well as "three," "seven," and "twelve." In the days of Noah the rain was upon the earth *forty* days and *forty* nights (Gen. vii. 12). Moses remained on Mount Sinai *forty* days and *forty* nights (Deut. x. 10). If a wicked man was to be beaten, the number of stripes to be given, by order of the judge, was not to exceed *forty* (Deut. xxv. 3). The men sent by Moses to search the land of Canaan were engaged in that employment *forty* days (Numb. xiii. 25). And the Jews who murmured on hearing the report of the spies, were denounced to wander in the wilderness, and bear their iniquities (a year for a day) *forty* years (Numb. xiv. 33, 34). Christ fasted *forty* days and *forty* nights in the wilderness (Mat. iv. 2). And was seen by the apostles *forty* days after his resurrection (Acts i. 3). And, in the Christian Church, the season of Lent, or penitentiary abstinence between Shrove Tuesday and Easter, was continued for *forty* days.

Thus we find a term of *forty* days had been frequently noticed in sacred history. Even an opinion of sanctity had been attached to it both among Jews and Christians. It was

associated with various events and usages of their religions, and had been employed as an expiatory and penitential period for uncleanness and sin.

The expeditions of the Franks, or Christians of the west, who, in the spirit of crusading, poured into Palestine to rescue it from the Mahometans, gave rise to quarantines for ships and sea-vessels. The readers of these expeditions well know what misery, want, uncleanness and mortality accompanied them as they marched or sailed. There was an incredible destruction of the human species by diseases, independent of the numbers who fell by way-faring accidents, or perished by the sword of the enemy.

After severe and costly exertions, the faithful accomplished their purposes, and established the kingdom of Jerusalem. But they held it uneasily, and they held it not long: for, forced at length to abandon their dear-bought conquest, the infidels once more took possession of the Holy Land. During the wars which had been waged between the Christians and Mahometans for the possession of Judea, the religious animosity of the two parties had been carried to the utmost violence of opposition and hatred, by every species of private as well as public aggravation. And the Franks, as they reluctantly quitted the country of the patriarchs and apostles, charged the Turks with all their disasters, and accused them as the authors of almost every evil which they suffered. Among other miseries, and that not the least in the enumeration, the returning Europeans affirmed that the Asiatics had infected them with the PLAGUE.

They forgot that the desolation of their armies by this disease had been so great that their line of march from their places of rendezvous could be traced through Hungary, and along the route to Constantinople, by the bones of the unburied dead. On this the Orientals might have affirmed that these invaders had imported the plague from Europe. Perhaps they did; but because similar sickness attended the Franks on their return from the Levant, produced by their customary uncleanness, bad management, exposure to hardships and want of necessaries, they roundly asserted the distemper was contagious, and the contagion caught from the infidels. To countenance this notion, they affirmed the Turks were fatalists; and, as they took no pains to destroy or avoid the contagion of this horrible disease, it was always alive and active among them. They persuaded themselves this contagion, if introduced, would spread like fire, and consume as

a conflagration. A prudent government, therefore, should guard against it by every precaution.

An interdiction of all intercourse with the infected cities of the Archipelago and the Levant promised the most perfect security from the contagion. But the policy and commerce of nations forbade so strict a prohibition. It was therefore agreed that travelling and trade might be carried on, provided voyagers, merchants, and every thing they carried with them, were subjected to certain salutary restraints; and one of these restraints was a QUARANTINE, or detention of *forty days and nights*, to conquer the pestilential contagion, or to let it die for want of something to feed upon. Latterly "quarantines" have been shortened to *fourteen, eight, or even three days*, according to circumstances.

Thus a dirty or sickly vessel, in a hot climate, with corrupting and perishable things on board, became more foul and intolerable from inbred mischief working within her during her quarantine in one of the Mediterranean harbours, than she had been during her voyage; and, by the most preposterous interpretation, all this local and domestic infection, hatched and reared by bad management in ships, and increased under quarantine regulations among the Christians, is ascribed to a *plaguy* contagion imported from Turkey, Syria or Egypt! And so, because quarantines were established in days of ignorance, prejudice, rancour and intolerance, between the Franks and the Turks, they have been adopted as matters of course by the Christian nations in their intercourse with each other: in consequence of which the ships of New-York are compelled to perform a quarantine at Cuxhaven, those of Baltimore at Cadiz, and those of Naples at Philadelphia, for fear of mutually importing yellow fever and plague. Surely these things are worthy of being better understood.

Quarantines, you see, thus arose from a desire of stopping a supposed contagion, caught, as was erroneously believed, from the Asiatics, and were tinged with superstitious notions or ideas of religion badly interpreted. During the *forty days* detention of a ship and cargo, the persons who were actually sick, or suspected to have contagion lurking about them, were removed to an hospital, to remain until the period of danger was supposed to be past. This hospital was called by one of the most odious and disgusting names that could be thought of. It was derived from LAZARUS, the decrepit beggar, who lay covered with sores, and starving at the rich man's gate. The *Lazar-house*, or *Lazaretto*, was the place of re-

ception for those who were suffering from pestilential nastiness and venom, and for those that were supposed to be in immediate danger of sickening by it, or of rendering others sick. Being constructed frequently of very durable materials, these Lazarettos were the receptacles of all the newly-arrived persons who were thought proper subjects of detention, for a great number of years in succession. Hence they became remarkably foul and pestilential. The chambers were often much neglected, and abounded in uncleanness and corruption. From an accumulation of all manner of impurity from year to year, those hospitals themselves became the *nurseries of the plague*; not arising from contagion here any more than on ship-board, but proceeding from animal excretions, corrupting provisions, and the like, undergoing putrefaction in a hot climate. The plague, engendered and perpetuated in these direful hospitals too, was most uncharitably ascribed to the Turks!

The local and domestic origin of pestilential distempers, and of alkalies to quell their exciting cause, is strikingly proved in the benevolent HOWARD's account of his quarantine at Venice, contained in his book on Lazarettos, p. 11. And if he had written nothing but this, he would have deserved the approbation of all classes of men. "Soon after unloading the boat," he writes, "the sub-prior came, and showed me my lodging in the NEW Lazaretto, *which was a very dirty room, full of vermin, and without a table, chair or bed.* That day and the next morning I employed a person to wash my room; *but this did not remove the offensiveness of it, or prevent that constant head-ache which I had been used to feel in visiting other Lazarettos, and some of the hospitals in Turkey.* This Lazaretto is chiefly assigned to Turks and soldiers, and the crews of those ships which have the plague on board. In one of the inclosures was the crew of a Ragusan ship which had arrived a few days before me, after having been driven from Ancona and Trieste. My guard sent report of my health to the office; and, on the representation of our consul, I was conducted to the OLD Lazaretto, which is nearer the city. Having brought a letter to the prior from the Venetian ambassador at Constantinople, I hoped now to have had a comfortable lodging: but I was not so happy. The apartment appointed me (consisting of an upper and lower room) was no less disagreeable and offensive than the former. I preferred lying in the lower room, on a brick floor, where I was almost surrounded with water. After six days, however, the prior removed me to an apartment in some respects better, and

consisting of four rooms. Here I had a pleasant view; but *the rooms were without furniture, very dirty and no less offensive than the sick wards of the worst hospital. The walls of my chamber, not having been cleaned probably for half a century, were saturated with infection.* I got them washed repeatedly with boiling water, to remove the offensive smell, without any effect. *My appetite failed, and I concluded I was in danger of the slow hospital fever," &c.* Strong prejudices were opposed to his having the room *white-washed with lime.* He, however, with great difficulty, got it done at last; and the consequence was, the noxious vapours were neutralized, and it was immediately rendered so fresh and sweet, that he was able to drink tea in it in the afternoon, and to sleep in it the following night. The other inhabitants of the Lazaretto admired these strange proceedings. Mr. Howard observes, that he left his successors an agreeable and wholesome room, instead of a nasty and contagious one.

This contamination of the walls of buildings seems to be less regarded now than formerly. In the times of the ancient Jews, the plague of leprosy, which invaded them, invaded their houses as well as their persons. This nasty distemper required a very particular method of treatment (ablution by water and anointing with oil), that the person infected by it might be rendered clean. The direction given was, that the person discovering this plague to be in the house should inform the priest of it, who should order the house to be emptied, and then proceed to examine the condition of it. The poison, acting as the exciting cause of the disease, possessed qualities enabling it to attack and corrode the materials of the walls, "forming hollow streaks, greenish or reddish, which in sight are lower than the wall."

Being curious to know the composition of this mortar, for the habitations of the wealthy, I sought carefully for information; and I am led to believe the cement or mortar now in use was the same which the ancient inhabitants of Syria, Judea and Egypt were wont to employ; that is, a composition of *two* parts of wood-ashes, *three* of lime, and *one* of fine sand, sifted, mixed and beaten intimately together, and softened with oil and water until they became of a proper consistence. One can easily comprehend how such a wall, after resisting and neutralizing a long time, could be corroded and discoloured at last by *septic acid gas.*

When the noxious matter or vapour thus showed itself in the house, and was spreading through it, the command in Le-

viticus is, to take away the very stones that are infected, and carry them to an unclean place without the city—to scrape the house within round about, and carry away the dust which is scraped off—and to repair the house with other stones and other mortar, and plaster it anew. And if, after these things were done, the plague shall come again, and break out in the house, it is directed to be demolished, and the stones, timber and mortar of it to be carried out of the city. A private family here was forbidden to live in an unclean house. Great pains were taken to purify it, and if it was found too dirty to be cleaned, it was to be pulled down as untenable. How different is the practice of modern times! A ship that has lost a succession of crews by inbred fevers is considered sea-worthy as long as her timbers and planks will hold together, without regarding the unhealthiness of her condition, nor whether she is too unclean to accommodate a family of human inhabitants. A Lazaretto, the slaughter-house of hundreds, whose floors and walls have imbibed putridity and infection ever since they were erected, is considered a proper receptacle for the wretches who have the plague, or are suspected of falling sick with it. A private dwelling in a city has been inhabited by unclean and indigent inhabitants for several hundred years; and in America some of these die of yellow fever, in Great-Britain of typhus, and in Turkey of plague. The exciting cause of these distempers being one and the same, only differently modified, invests them closely, and sallies forth from its lurking places in every part of their habitation. Yet this house is tenantable, and some new inhabitant to-day takes the place of the victim of yesterday. In these examples, the ship, the Lazaretto, and the house, are the places where pestilence is engendered. Local origin, in every instance, as in the leprous-house of the Jews, bears sway, and ought to be guarded against by removing contaminated materials, by scraping and fresh plastering according to the Levitical regulations, or by actual demolition.

There is one subject of inquiry which the Europeans who have travelled to Asia have generally omitted. This is the domestic economy of the inhabitants. To a person who reflected on the frequent occurrence and destructive violence of pestilential distempers in some of the ports near the eastern shores of the Mediterranean Sea, it would appear certain that there must be bad management, either within the houses and their appurtenances, or in the cities and their purlieus, or in both. That there is a kind of human nastiness, whence

unhealthy and fever-producing exhalations proceed, is sufficiently well known. And if the Mahometan way of building houses, and living in them, throughout Syria and Egypt, tends to promote the accumulation of this foul and noxious matter, then a proportional degree and extent of sickness and mortality may be expected. But in vain do we search the books of the principal part of the physicians, philosophers, and mercantile, and merely curious travellers, for this kind of information. It has been deemed, probably, too vulgar and unimportant for a polite and entertaining writer to treat of. Yet I am bold to express my conviction, that the origin and cause of their endemic fever or plague can never be understood without it. And it is for want of this knowledge that the greater number of those writers who have treated of this disease, have done it with so much prejudice and with so little intelligence.

Of all the travellers to the Levant who have published their observations, none that I recollect has presented a more learned and useful account of what the neighbouring countries contain than the Rev. Dr. THOMAS SHAW. The description he has given of the houses and way of life among the Mahometans is invaluable. He has, among other things, drawn a plan and explanation of a Mahometan dwelling, which shows it to be almost as much adapted to engender and accumulate pestilence as a Venetian Lazaretto. The houses in their cities, he observes (*Travels in Barbary and the Levant*, p. 273), are unfavourable to ventilation. Both in Barbary and the Levant, the method of building seems *to have been the same from the earliest ages, without the least alteration or improvement*. There is little communication by windows with the streets, for all of them open into *private courts*, if an exception be made of a latticed window or balcony *sometimes* toward the street.

The streets are narrow. On entering a house, a visitor seldom gets farther than a porch or gate-way, with benches on each side, where the master of the house receives company and transacts business. On *extraordinary* occasions, access may be gained to a quadrangular court, or inner space, lying open to the weather, and commonly paved, so as to carry off water and family-offal. Rarely or never does the company, even on such occasions, obtain entrance into one of the adjoining chambers, but remain in the open court, which is sometimes covered with a veil or awning. This court is called the *middle of the house*, and, on occasions of

great parade, is cleaned out, and spread with matts and carpets. This court or area is generally surrounded with a cloister or colonnade, over which, in high houses, there is a gallery erected, with a balustrade going round about it. From the cloister and gallery there are doors which conduct to the chambers or dwelling-rooms, *which very rarely have any connection with each other*. When a father permits any of his married children to live with him, or when several persons join in the rent of one house, *a single chamber serves for a whole family*. Hence it happens that the Mahometan houses and cities swarm with inhabitants—that nastiness and home-bred infection are very common—and that such vast numbers of people are always swept away by the plague.

At Cairo the narrow streets are thronged with passengers; several families live in one house, and a number of persons in each chamber of it (*ibid.* page 340). Among the poorer class, in the villages on the Nile, the houses are commonly constructed with *mud walls*; and with the same muddy material are the walls of the huts of the stationary Arabs partly built. In such circumstances, how is it possible to avoid pestilential distempers? The proof is as clear as it needs to be, that the plague of Asia is not propagated by a *morbid animal secretion*, like the virus of the small-pox and other contagions, but, like the yellow fever of America, owes its existence to the *septic exhalations* which proceed from the putrefactive processes going on in the clothing, chambers, provisions, excretions, and, in short, in almost every thing belonging to the wretched inhabitants. The *common, putrid efflu- vium* is the exciting cause of disease in both cases. But as to *contagion*, there is not the least evidence of its existence. SANDYS relates (*Travels*, page 27), that the best of the private buildings at Constantinople are inferior to the most contemptible of the English. And as women are prohibited by the Koran to buy or sell, or show themselves publicly, what must be their condition of domestic economy?

Notwithstanding the locality of pestilential virus in all places favourable to its production, nations are railing at each other as being lazars or lepers. It has been said that the Minister Plenipotentiary of the United States at Madrid has presented a memorial to the Spanish government, the object of which is to procure a mitigation of the excessive rigour with which American vessels are compelled to perform quarantine in the ports of that kingdom. To this the Spanish government have made no reply. They intend, doubtless, to enforce the re-

gulations very strictly, to prevent the importation of the western plague from the atlantic cities of North-America! We may think this a grievance; but it must be allowed the Spaniards act consistently. There are physicians, merchants and legislators among us, who declare the autumnal distempers of our climate are contagious, and that ships, cargoes and crews, contain a great deal of that contagion. Now, under such assurances, added to their own prejudices, the Spaniards declare they will keep the evil out by all possible means. And who can blame them? They imagine their situation is such as to expose them constantly to the contagion of plague from the east, and of yellow fever from the west. This is an unhappy sentiment; but before the people of America complain of it, it becomes them to grow wiser themselves. When they have cleared the mote out of their own eye, they may venture to remove the beam from their brother's.

Amidst the oversights and blunders on these subjects, there is another which deserves particular notice: This is the article of provisions for human food. "Provisions," says Mr. Howard, "have never been suspected of being infectious;" therefore they have never been subjected to purification or destruction in any of the ports of the Mediterranean Sea. While cotton, both raw and manufactured, was subjected to the most rigid quarantine, beef and pork, and other articles of provisions, were never thought worthy of one moment's detention as containing any thing noxious. There is reason to believe there was a great omission here; and the damage done by the fluids exhaling from corrupting provisions has been falsely ascribed to contagion, and traced to Turkey. On this point you and I have a right to judge. America is a country abounding in provisions, which are exported to the greater part of the commercial world. The people of the United States are greater consumers of animal food in their diet, than, perhaps, any civilized nation upon earth; therefore, as a great quantity of animal food is consumed, salted and inspected, and much of what is inspected is afterwards exported from our hot climate to the hotter regions of the South, we have opportunities of knowing much about them in all their varieties and degrees of corruption. We well remember that the healthy town of New-London was almost depopulated in 1798 by the putrid vapours exhaling from *corrupting codfish*. (Med. Rep. vol. ii. p. 372—378, 2d edition.) From putrefying *hides, beef, and fish*, the same year, the town of Boston was poisoned by septic effluvia (ibid. p. 442—448.) The same year our own city

was rendered unhealthy by the gasses emitted from large quantities of rotten beef; a pestilential disease broke out, and many of the inhabitants lost their lives. These causes which poison cities can render ships sickly and uninhabitable. Several ships of the American Navy have been already visited by mortal sickness in consequence of provisions spoiling on board. I have a very correct statement of sickness bred within a ship on her passage from Liverpool to Philadelphia, in consequence of a barrel of stinking beef stowed below the steerage. And it is understood to be an occurrence of course, that American vessels which carry salted provisions to the West-Indies, or other foreign markets in hot latitudes, are most likely to lose their seamen by diseases. From these and numberless other facts of the same import, it is rendered very evident that provisions, though not at all suspected of being infectious, are often changed by corruption into pestilential air, spreading sickness and death to human beings within its influence. The Europeans have been so intent upon their fancied *contagion*, that they have overlooked the process of *putrefaction* almost entirely; and have unfortunately ascribed to the former the mischievous effects occasioned by the latter.

From these sources the atmosphere becomes contaminated, without the knowledge, and oftentimes without the belief of the people who breathe it: It is changed then from an enlivening composition to a mixture of poison, verifying the words of the philosophical poet:

It is not *air*
That from a thousand lungs reeks back to thine
Sated with exhalations rank and fell,
The spoil of dunghills, and the putrid thaw
Of nature; when, from shape and texture, she
Relapses into fighting elements;
It is not *air*, but floats a nauseous mass
Of all obscene, corrupt, offensive things.

ARMSTRONG.

If thus the existence of contagion is disproved, the regulations concerning areas and stores for unladed goods and merchandize, will be as plain and intelligible as the airing of featherbeds and blankets in ordinary house-keeping. The chief attention should be directed to corrupting provisions, human excretions, clothing and bedding, and to hides and other things, which, when they putrify, are known to furnish pestilential air. From these ships derive their unhealthy taints, and have been known to poison several successive crews that have gone on board of them.

Vessels retain the pestilential taint, because, 1st, from their structure it is difficult to introduce a sufficiency of fresh air to waft away the infectious gas; 2d, from the manner of their construction it is also exceedingly difficult to scrub, scour, and cleanse them, by lime and alkalies, as houses are purified; and 3dly, from the preposterous custom of pronouncing a vessel clean after she has been pumped out, and fumigated with tar and brimstone; while, in fact, she is as foul *after* being smoked as she was *before*. The negligence of navigators and owners of vessels on these points, renders it absolutely necessary for public authority to interfere. All that I think necessary in the business, is, that the never-failing methods of *house-cleaning* should be applied to *ship-cleaning*; in the way that you have adopted with such happy success. And if the time shall arrive, when sea-vessels shall be kept as clean as genteel habitations on shore, their crews and passengers will suffer as little by infection and pestilence; and then the dream of importing diseases from foreign countries will be forgotten, or insisted on no more as a reality. And that this is not a mere conjecture, but a practical fact, is confirmed by the experience of the Dutch navigators; for they, carrying with them to sea the habits of that precise and unequalled cleanliness which prevails on shore in the United Netherlands, are rarely or never troubled with the fevers, the plagues, and the infectious distempers which incessantly harass the nastier nations of the earth.

ARTICLE II.

On DEGENERACY of CONSTITUTION among the POOR in GREAT-BRITAIN. By Dr. BEDDOES.

[From the Medical and Physical Journal, vol. vi. p. 24.]

IN no inquisitive age has there existed a moment more favourable than the present for illustrating a great physiological problem; I mean the influence of the condition of parents on the number and condition of the progeny. One cannot help fearing that, in consequence of the long and severe scarcity, a degradation of the species, partially begun in certain manufactories, will become general and permanent among us.

The political economist will attend to the proportion of births and marriages during this most disastrous period. The medical philosopher will look more closely into the subject.

Nor will any thing short of a body of information concerning the state of new-born infants satisfy him. Without stopping, therefore, to demonstrate the propriety of the investigation, I propose to those who have opportunities of observation the following queries:

1. Have the children of the poor, of late, come into the world more puny, meagre, or smaller, than in more plentiful times?

2. Have they appeared to die in greater numbers shortly after birth, and with what preceding symptoms?

I also wish to know,

3. Whether miscarriages have been more frequent among this class? And,

4. Whether the mothers have recovered more slowly, and been subject to greater losses of blood?

ARTICLE III.

The following, or similar Addresses, are distributed in the Metropolis, and many other Parts of the Kingdom of Great-Britain.

ADDRESS TO THE POOR.

[From the Medical and Physical Journal, vol. vi. p. 116.]

THE experience of several years has fully proved, that inoculation for the cow-pox is a certain *preservative* against the small-pox; and is, besides, so mild and safe a disorder, when compared with the inoculated small-pox, that it has been generally introduced among the better informed and more wealthy inhabitants, both of this kingdom and of various parts of Europe. In order, therefore, to impress strongly on the minds of the poor, the usefulness and superior advantages of this new plan of inoculation, it is thought proper to state, in this public manner, the following observations, for the serious perusal of all those poor persons who feel a *proper affection for their offspring*, and who are desirous of promoting their own interest and comfort.

1. *Inoculation* for the *cow-pox* has been practised for several years, with constant success, in various parts of this kingdom.

2. It has never failed to prevent the infection of the natural small-pox.

3. It may be communicated with safety to persons of every age and sex, and at all times and seasons of the year, with equal advantage.

4. The cow-pox is much preferable to the inoculated small-pox, as being a milder and safer disease, and not capable of infecting the persons living in the same family, or even sleeping in the same bed.

5. It does not produce eruptions which scar and disfigure the face; and is seldom, if ever, attended with any other marks of the disease than what appear on the arms from inoculation.

6. Neither swellings, blindness, lameness, nor any other complaints, which are known frequently to be the consequences of the natural small-pox (and sometimes, though but seldom, of the inoculated small-pox), have been observed to follow the cow-pox.

7. Alarming fits frequently seize children when sickening of the small-pox; and, while cutting their teeth, this disorder often proves dangerous: but no such objections lie against the cow-pox.

8. So far from proving hurtful, delicate and sickly children are often improved in health by having passed through this complaint.

9. Scarcely any remedies or attendance are required for the cow-pox.

10. There is no necessity for a course of physic either before or after inoculation.

11. *The time of the parents will not be taken up in attendance upon the sick, to the injury of the support of the rest of the family: and to poor families, this is an object of no small importance.*

ERRATUM.

In the review of Dr. Caldwell's Memoirs, page 204, fifteenth line, omit the word "justly."